

# AVIATION WEEK

A McGRAW-HILL PUBLICATION

JUNE 6, 1955

50 CENTS



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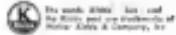
You can depend on pneumatic systems over an extremely broad temperature range. Pneumatic systems are fast-acting type ...  $-80^{\circ}$  to  $+250^{\circ}$ , because through that range, viscosity of the air used in the system remains essentially the same. Pneumatic systems are never sluggish!

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Domestic

Douglas Aircraft Co. delivered Embraer Air Lines' first DC-7B last week, following acceptance of new overwater version by Pan American World Airways and type certification by Civil Aeronautics Administration. EAL will put the 418-seat transport into New York-Miami service July 17, and will take delivery on the second and third aircraft, plus the fourth, in 25 P.M. on July 20. DC-7Bs in Miami for overwater certification now will start North Atlantic flights June 15. Both versions are powered by Wright Turbo Compound R3350-DA engines. The overwater version, equipped with saddle tanks, has a maximum range of 5,120 miles. Douglas reported the DC-7Bs generated gross weight was increased to 126,000 lb. from 125,000 lb., takeoff length cut to 6,180 ft. from 6,500, and landing length reduced to 5,000 ft. from 5,900 ft.

MacDonald Aircraft Co. turned down follow-on offers by United Aircraft Corp. to merge the smaller firm into UAC's aerospace division. The best offers of the corporation, for financial and developmental reasons, of interest to defense producers is an continuing Macdonald's activities as an independent entity, the company's management said, "and augmentation leading toward a merger with United Aircraft Corp. should not be pursued."

Patriotics Aviation Corp. received a \$1,939,000 contract from Douglas Aircraft Co. to produce 150-seat turboprop test beds for the AAD, F4D, F1D, and F1C, and the AD-5 and AD-6. The 100-seat 16-ft-long test beds were designed by Douglas.

Air Carrier Service Corp. signed a contract with Capital Airlines to sell CAPS DC-4 fleet as follow-on Vickers Viscounts are delivered.

Trans World Airlines inaugurated nonstop first-class flights between New York and San Francisco June 1 with Lockheed 1049C Super Constellations.

Texas Aircraft Corp. was a subcontractor from North American Aviation to produce F-100D swept-wing, jet-powered and ejection-seated fighter-bomber. Total value of the award: more than \$1 billion.

United Air Lines converted nine flat-top Douglas DC-6s to 72 passenger airplane configurations.

Douglas Aircraft Associates pur-



Lockheed Tests Two C-130s

Two prototypes of Lockheed Aircraft Corp.'s turboprop C-130 Hercules jet into the air together for the first time. First prototype (background) is being tested at a gross weight of 14 tons. Second (foreground) undergoing electronics and power checks. Production USAF transports are rolling from Lockheed Georgia plant.

chased Industrial Associates, Inc., and is moving the firm's entire aerospace and physical assets from Los Angeles International Airport to Long Beach, where it will operate in a division of Douglas.

Financial

Roku Aircraft Corp., Chatsworth, Calif., earned a \$2,151,000 net profit during the nine months ended April 30, compared with \$2,645,600 for the same period last year. Sales dropped to \$511,120,000 from \$77,960,000. Current backlog stands at more than \$121 million.

North Central Airlines had a net profit of \$10,032 for the first four months of 1965, compared with a \$278,613 loss during the corresponding period last year.

Century Engineering, Inc., Burbank, Calif., reported a backlog of \$6 million.

Chase Vought Aircraft, Inc., Dallas, declared a 40-cent dividend, payable June 25 to stockholders of record June 10.

International

Russian Air Force is taking steps to produce scheduling function for jet loaders, according to Kremlyov Zemtso, daily newspaper of the Soviet Ministry of Defense. An article written by Engineer-Major T. Rayzayev said the

truck will be "equivalent in type to jet bombers."

First F4M Skyhawk to be assembled for NATO by Italy's Fiat made its initial test flight at Turin. The aircraft was put together from parts shipped to Fiat by North American Aviation. Similar to the F-86D, NATO's all-weather interceptor is armed with four 20-mm cannons instead of rockets and carries a North American-designed MC-4 fire control system.

Quebec Charlotte Airlines turned down an offer by Pacific Western Aviation, as well as from Canada's British Columbia, to buy QCA for an estimated \$930,000.

Royal Australian Navy plans to acquire four four-engine turboprop-powered Fairey Gannets and was won by de Havilland's pt Sea Venetian. The new aircraft will be delivered to Australia in May 1966.

Air Vice Marshal Sir Francis Mather, 56, retired World War II commander of RAF's Strategic Air Force, Eastern Air Command, was lifted in a helicopter accident May 23 at Cheltenham, Gloucestershire, England.

Toronto-Canada Air Lines' Lockheed Super Constellation flew London to Montreal in 18 hr 35 min, setting a new TCA record for the 3,750-mile zone. Average speed: 333 mph.



## "You'll find many uses for the SIDE GRIP CLAMP"

Here is one of the most versatile of Monogram's extensive line of sheet metal clamps . . . the Side Grip Safety Clamp. It is used in operations where the edges of the material to be held are accessible.

The Side Grip Clamp is easy to apply with either Monogram Safety Pins or Safety Gas. Strong spring tension holds it securely in place. In five sizes, accommodating materials from 3" to 8" thick and applying tension of 70 lbs.

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## WHO'S WHERE

### In the Front Office

William R. Rogers, executive vice president of Glenn L. Martin Co. Baltimore, in addition to his new duties Rogers will also continue in his position as vice president of operations.

For E. H. Horwitz, vice president research development and engineering, Keflavik Aircraft Corp. Concourse N. J.

Harry A. Simonis, aviation advisor to the president of Ohio Mohawk Chemical Corp., New York, which has substantial interest in Aerospace Aircraft Co. and Research Motors Inc.

### Honors and Elections

M. W. McLeod, East-Central Air Lines, recipient of the 1954 McGarry Award at the Canadian Association's Annual General Meeting in Toronto.

### Changes

Dr. Ernest Kopelson, chief engineer of Sylvania Electric Products Atomic Energy Division, Raynham, Mass.

Richard G. Roman, assistant chief engineer of Republic Aviation Corp., Farmingdale, N. Y., has been appointed chief engineer to William J. O'Donnell, development and experimental, and Robert L. Bussey, administrator.

Adolph Bierman, assistant chief engineer and S. G. Finch Hart Jr., chief development engineer, Cincinnati Gas & Electric.

E. Chouteau, director of Headache Supplies Corp., a corporation which produces other clamp; Robert D. Eggle, manager of the company's new premises (engineering laboratory of Flanders, Codd, and Clark); S. Saito, consulting engineer.

J. Frank McLean, administrator and new head of Bell Gas Co.'s Aviation Engine Division, Cincinnati.

Harry V. Saylor, manager of Oakite Products' new Export Division, New York, N. Y.

Alberto Monzo, US general manager for Hispano-Suiza, Inc., has been appointed to the El Salvador presidency for \$300,000 to \$319,900 in small numbers, and for considerably less in quantity. Engine cost is estimated at \$340,000.

First Spanish-built helicopter has been successfully tested by the Spanish Air Ministry in Madrid. Aircraft was designed by French engineers and constructed under this supervision by the Hispano Aviacion. It is powered by a 260 hp gas turbine engine.

Dassault M.D. 520, lightweight delta wing jet fighter, is now complete. Dassault claims the new single-seat fighter will supersede other aircraft in its class.

Goodyear Aircraft is developing the guidance equipment for an improved version of the Martin T-33 jet missile. New missile will have greater range and longer range. Test firing is being done at Holloman AFB, N. M.

Lockheed Aircraft Corp.'s F-104 has been returned from Farnborough, Calif., to Edwards AFB for further flight testing.

During evaluation trials of the C-130 radar on a Convair 340 for United Air Lines, it was found that the radar also improved the aerodynamic control of the plane for an 8 mph speed increase.

## INDUSTRY OBSERVER

Aircraft Industries Assn. has proposed to the Department of Defense that the aircraft manufacturer be permitted to bid for the purchase of surplus airmobile equipment by giving the government a credit which would be applied at an offset to market contract payments covering new sales of his products to the services.

Approximately 18% of Navy aircraft surplus program in Fiscal 1956 will be done by private contractors. Navy plans to conduct a total of 1,991 surplus type contracts at an estimated average unit cost of \$92,000. The maximum is 2,500 aircraft contracts in Fiscal 1955 at an average unit cost of \$85,000.

Development of North American's transonic transonic aircraft section is under way at Ohio State University's aerospace laboratory. Tests made in Ohio State's blowdown apparatus have included force and pressure distribution work on the North American F-100 Super Sabre and development of combined walls for reducing shock wave interference in the test section.

Navy had only 206 aircraft equipped with afterburners as of Mar. 1, 1955.

De Havilland plans to fit in at the same time short water tank tests on a fully modulated Convair II this summer, perhaps in time for the Farnborough show. De Havilland also hopes to flight test the first 58-76 passenger, 500 mph Convair IV in 1957 with first commercial delivery to British Overseas Airways Corp. in 1958.

Air Force is making 5000 flights in Fiscal 1956 for military fuel tank which will bring USAF up to 70% of its present tank requirement. Costs range from \$150 for a 200-gal tank and as an \$845 to \$8,500 for a 1,700-gal tank.

British hope to have the 450-hp thrust version of the Orpheus engine ready for the Folland Gnat in time for the Farnborough show in September. Orpheus also is scheduled for use in the Fiat G-91, the Breguet T10 and the Hawker Hunter 35.

Average cost per hour of operating Navy aircraft will increase from \$23.50 in Fiscal 1954 to \$49.79 in Fiscal 1956. Because Navy will have a larger proportion of jet aircraft which burn more fuel per hour.

Nagae & Son, Ltd. is interested in establishing arrangements with an American engine manufacturer for the production of the Elfa engine under license in the U. S. Nagae's intention is that the Convair-Lockheed can be converted to the Elfa. License fee for \$300,000 to \$319,900 in small numbers, and for considerably less in quantity. Engine cost is estimated at \$340,000.

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## TITANIUM speeds the Fury's flight...

North American's FJ-4, latest of the Fury series of Navy jets, flies with vital parts made of titanium—from nose to tail. For the fastest of the Furies has a heritage of titanium.

It was because of titanium's high strength weight ratio—its corrosion resistance in an air—its freedom from stress-corrosion cracking that titanium was specified for the FJ-2 and the FJ-3. It was the production experience and the performance of REM-CRU titanium alloy parts under the rugged conditions of supersonic flight that led

to the further use of REM-CRU C-110M and C-120AM for primary fuselage frames and stiffeners, webs, angles and wing spine fitting on the FJ-4.

REM-CRU, pioneer in titanium alloys for aircraft applications, has expanded production facilities for sheet, strip, plate, bar, wire and tubing. This means your selection of size, shape and alloy grade can be delivered on schedule for your requirements. And REM-CRU engineers are always ready to assist with the application and fabrication of titanium.

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# REM-CRU TITANIUM

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## Washington Roundup

### Aircraft Investigations

Investigations of aircraft defense contractors are under way on Capitol Hill. It won't look into the public highlight for several months, some not until next year when the president will be at stake.

Senate Banking and Commerce Committee, headed by Sen. William Fullbright, a drawing up its own list of companies with the largest volumes of defense business. Staff members of the Defense Department's list (AW May 30, p. 15) completed some of the joint.

The committee is interested in the effect of defense business under the military buildup—which started in mid-1950—as the stock market and the economy in general.

Defense Department's report to the committee lists the value of contracts let between mid-1951 and the end of 1954. It shows firms such as General Motors Corp. and Chrysler Corp. with "modest" volumes of defense business.

One and another committee. "It took Defense Department 10 weeks to draw up this list for us. We're asked to do the next one with the background we were given," The report on the committee's list, first such as General Motors—which isn't even among the 100 firms with the most defense business in the department's list—will show up as the top company on defense contracts.

John G. Copley, Deputy Assistant Secretary of Defense for Logistics and Supply, said: "The report was made for the 18 months—just as the specific request of the Senate committee. They asked for that particular period of time."

House Armed Services Subcommittee, headed by Rep. Edward H. Eckert, was open hearings by August. The subcommittee is investigating all conceivable aspects of an aircraft contract—air Force and two Navy.

House Appropriations Armed Services Subcommittee, headed by Rep. George Mahon, is just starting its available an investigation staff (AW May 21, p. 17). "We are not out to find individual cases of graft—although I expect there is some of that," Mahon told *Aviation Week*. "We want a very thorough investigation to find out what the contractors are getting in for defense business. This will take a long time and many field investigations of the contractors."

The project. The subcommittee may use an auditor to check on defense officials when they appear before it early next year on the budget for fiscal 1957.

Senate Appropriations Subcommittee, appointed over two months ago with Majority Leader Sen. Lyndon Johnson as chairman, hasn't had an organizational meeting or selected a counsel and staff.

### Aircraft Representative Controls

Aircraft Industries Association is seriously disturbed by Air Force efforts to tighten controls over field service representatives. USAF, which has the major share of about 2,100 company representatives at military installations, wants to put them under separate contract, divorced from the production arrangement with their employer.

Ogden: To keep better track of the representatives and what they do, make it possible to cut down on their

numbers, change their cost to proper USAF service and provide the money when companies ask how much is spent for that purpose. In addition, USAF charges field representatives sometimes enormous commissions, above their profits, upon certain contracts or are irregular with accounting problems. In addition, on the other hand, inspect each the representatives should be present when USAF uses an aid for them. This is to provide better service for customers, provide prompt communication with plant when there is design change ideas are brought to light.

### CAB to Speed Cases

Civil Aeronautics Board Chairman Bass Radley has set his schedule for processing major cases.

New York-Chicago Case with 21 participants. Oral argument will start in August or September.

Detroit Case, with 9 participants. The Board's decision will be issued in the fall, after oral argument during September.

Trinagle Case, with 212 participants. The Board hopes to dispose of the before the end of the year.

### Prototype Testing

Legislation extending Civil Aeronautics Administration's \$12.5 million authorization to test prototypes of new transport types seems to have little prospect of success. The subcommittee has been on the books for two years. But after several failures, CAA stopped attempting to obtain funds from Congress to implement the program.

CAA and the industry, though, would like to keep the authorization on the books—in case the climate might change.

The legislation proposed by Sen. Warren Magnuson would extend it another five years, from the expiration date Sept. 30.

### ODM's Dispersal View

Defense Mobilization Director Arthur Flemming attempted to put industrial dispersal, above a hot political issue, in perspective at a Congressional hearing. He advised: "We regard this as an age of peace." The Flemming has defended that he is 40 to 50 years and we think that industrial dispersal objective is one that should be set within this framework, and was regarded as an objective to be achieved overnight. In fact, it cannot be achieved overnight.

"I feel that we have reached the place where we have to do this on a case-by-case basis and that we cannot apply nationwide standards... dispersal is a feasible objective but we cannot let it become an end in itself, because another objective we must always keep in mind is a properly functioning urban economy. If we went wild on dispersal we could destroy our urban economy, and instead of strengthening our strategic position weaken it."

Meanwhile, ODM is working on four dispersal plans to meet objectives that might develop. Involvement in local institutions, general mobilization not involving an attack on the U. S., general mobilization with an attack on the U. S., and prompt mobilization at the goals of a better, reorganized by an attack on the U. S.

—Washington staff

## USAF Recognizes Red Gains, Spurs B-52

Boeing bomber production schedule is accelerated, reversing Administration position on Soviet air power.

By Claude White

Washington, D. C.—U. S. Air Force has accelerated production of the Boeing B-52 bomber, reversing the Defense Department's policy of discounting the threat of growing Russian air power. At the Pentagon last week, senior action was being considered for fighter aircraft as the "Century Series" now in production. These include the North American F-100, McDonnell F-86, Convair F-102 and Lockheed F-104.

Demands to speed production output of USAF's largest and fastest jet bombers followed congressional pressure led by Sen. Stuart Symington, a former Air Force general, and assistance in Senate Virus (May 23, p. 32) of the facts about recent Soviet deployment of new planes near Moscow.

Subsidized rate of increase in production of the B-52 is 35%. Expected cost is \$300,000,000.

News of the increased production rate of the Boeing bomber came only 45 days after a press conference in which Defense Secretary Charles E. Wilson confirmed figures on the recent Moscow air display as published in *Aviation Week* but maintained that the U. S. does not hold superiority, and said he did not expect to add Conair for more USAF "appropriations."

President's Views

Chairman Poston began soon that a full scale investigation of U. S. airpower for atomic war and how top Defense Department officials violate and use misleading information would be avoided.

The evidence last week was that the Administration was right, bolstered by the program made in Russia but was attempting to avert any possible overreaction by making big jet bombers look faster than the original schedule.

While Sen. Symington and other Democrats favored an investigation, a pointed discussion has not been arranged.

Sen. Lawrence Saltonstall and other Republicans discussed the need for action, insisting that the U. S. holds at least qualitative superiority and has a big advantage in the location of its

strategic bases. Sen. Saltonstall refused to comment on the decision to speed B-52 production.

President Eisenhower last week and Monroe had exhibited every modern jet bomber that the U. S. had anticipated. But, he insisted, the American B-52 is still a good plane. He made no mention of the disclosure that the Russians now known to have thousands of the new MiG-17, an aircraft comparable to the North American F-100 and an efficient weapon against bombers of the B-52, is 30.

It was USAF Secretary Harold E. Talbott who announced that production of the Boeing B-52 Stratofortress will be accelerated 35%, cutting one year off the original date for completion of scheduled deliveries. The decision was announced almost immediately after Talbott and Gen. Nathan F. Twining, Air Force Chief of Staff, were installed in executive session by the Senate Armed Services Committee.

Wilson's Views

Only two days before, Defense Secretary Charles E. Wilson, bethersed his press conference by Roger L. Lewis, USAF Assistant Secretary for Materiel, showed no signs of being disturbed by the reports of Russian airpower gains. They assured the U. S. it retains its qualitative and quantitative air superiority.

Wilson and Lewis indicated that there is no cause for concern because the B-52 is being built at both Seattle and Wichita plants of the Boeing Airplane Co., and production could be increased at any time.

Sen. Wilson: "We can step up our production on specific items at any time as determined necessary to meet any threat to our nation."

He did not describe the Moscow air display as a threat and indicated there would be alteration of production schedules.

Government Reaction

Reaction of Senate critics to the short-term B-52 increase was expressed by Sen. George H. Mahon, who commended the Air Force for its action, insisting that the U. S. holds at least qualitative superiority and has a big advantage in the location of its

Effect on Boeing

Boeing spokesman told *Aviation Week* they do not expect increased production of the B-52 will cause any appreciable increase in employment rolls.

They pointed out that the learning curve at the Seattle plant is declining. It was expected that there would be more reduction in employment, caused by account attrition. Under the new program the figure is 35,000 men stable. At Wichita, where the B-52 is being built, no attrition has been completed, the number holds low because the company is gradually phasing out the B-47 jet bomber.

Additional facilities needed at the two Boeing plants will be minor, the company said, mostly in the area of machine tools.

The wide subcontract base already established for the B-52 project, involving several major aircraft and component manufacturers, is expected to popularize the program. Boeing said some additional sources may be needed.

It had been more frank and factual in its 44-page report to the Air Force on production of the B-52.

"The information on which the Air Force decision is based was available to Mr. Wilson at the time of his press conference, especially as it had already been made available to our Atomic Energy Subcommittee through the chairman of our top nuclear leaders," Sen. Jackson continued.

"The implement truth is that for the next few years the ability of the U. S. to stay ahead in the armaments race will depend on the extent to which we pass development of our delivery systems. This involves a considerable range jet bombers but jet aircraft and, as well, together with our wide funds of guided missiles including the most advanced of all—the intercontinental ballistic missile."

The key for this last weapon is the most vital since the need for the hydrogen bomb and only a costly effort in this field by our government can meet it.

"In the past we have lost a large lead in industrial technology over the Soviets. We can no longer talk vaguely about our superior reduced cost and industrial know-how. Today we find that the Russians are willing to dedicate a sufficient part of their

industrial potential to a given amateur field, they must be treated in earnest."

"We simply can't afford to take second place in any of the areas to develop the most effective delivery system for nuclear weapons," Sen. Jackson said.

Senator 'Not Satisfied'

Democratic Sen. Wayne G. Magnuson, citing cuts in research and development funds in the weapons area granted him, said, "There would be more cause for concern that we have on the drawing boards and ready for production new, faster and better models."

Magnuson, a member of the Senate Appropriations Committee, charged "the civilian leaders in the defense establishment and the Administration have not recognized and still do not recognize the basic cause of our weak position."

There would be more comfort in an announcement from the Administration of an accelerated program for research and development and for training scientists and engineers, who are available to us."

Another member of the Senate Armed Services Committee, Democratic Sen. Sam Ervin, said he was satisfied with the announced 35% increase in production rate for the B-52.

"I think it should be stepped up more," he said. "We must realize we're living in dangerous times and act accordingly."

Democratic Rep. Cleve Eagle told the House that General Twining himself did not underestimate the Russian threat and pointed out that the USAF chief had bluntly told Soviet long range jet heavy bombers "go at your own risk."

Eagle congratulated Twining for an outstanding implementation of Russian policy, using the "line of quiet" strategy and have maintained the strength from which he has derived success. He also has building an offensive long range bomber force to deliver the nuclear weapons that they also achieved ahead of the schedule we had set for them."

Effect of Decision

Accelerated effort on the accelerated B-52 production schedule had several facets:

• Unofficial estimate was that USAF would add Congress at once for \$100 million in additional funds to meet added costs of the program. This was for the bombers alone, did not include money for possible increase of planes.

• There were reports that a total of 500 B-52's is involved in the Boeing order.



CHANCE VUGHT F7U-3 CUTLASS comes into a dogleg headed by a North American AJ-2 rocket during Navy demonstration of its aerial refueling concept for carrier-based interceptors (AW May 14, p. 88). Both are from *Av Development Symposium*, 3.

Conair B-52 is replaced for the new heavy jets. At present 18 heavy bombers are 30 aircraft. This probably will be increased to 45. USAF has 18 heavy bomber wings.

• USAF already has a reduction in mounting funds, but not yet one personnel problem is about aircraft later than the original schedule. Transition training for air and ground crews and operational delivery program will be increased by the change. It is anticipated that the fiscal 1947 USAF budget request will reflect the need for money to meet these contingencies.

• While airbase thought is being given to the necessity for improved continental defense, there was no indication that anyone outside of USAF is a detrac-

tive to the project. Secretary Wilson and the U. S. will depend on superior technology rather than maintaining the B-52's in number of planes. A. and later, President Eisenhower said, he did not know that the Air Force will not be more aware for continental defense, but he hoped that the Russian long range bomber force will spur America to do more for the total defense program.

• Post & Whitney Division, United Aircraft Corp., is prepared to step up deliveries of the J57 engine. Eight of the 10,000-lb thrust turbines are used to power the B-52.

• Mary's Bureau of Aeronautics said that no increase in the production rate of carrier aircraft is contemplated.



the Weapons Systems Evolution Group, dedicated to a constant operation, is available with a minimum. Expansion of this activity is needed, according to the study, because it is of so much importance to the Joint Chiefs of Staff.

#### Personnel Requirements

Other highlights from the report:  
• The study found no way, save about the organizational structure and personnel of high professional capacity in finance, logistics and personnel that there are in R & D where such a policy would bring the greatest reward.

• There should be more applied research in the areas of basic and applied science. In 1954, the type of work conducted had a \$20 million of its possibilities for investigation, due to our progress in new weapons systems.

• Expansion, since the war is R & D activities and personnel for operations by the Joint Chiefs of Staff, at a lower level of effectiveness than could be obtained from combat agencies—distrust, immaturity and low performance factors.

• Military personnel at the office level in R & D should be more prone, and the commission had not enough young of

items are being funded for the complex should. This will be a shift of a portion of the work in outside agencies, about 10% of the appropriated R & D funds used to be spent within the Defense Department and concurrent rates are needed to increase these projects.

• High priority can given to both the National Advisory Committee for Aeronautics and the Atomic Energy Commission in their competence and contribution to defense. The Lawrenceville Authority accepted much of work in relation to certain gases.

• Members of the Task Force report on the Defense Department R & D cost areas. Marvin J. Kelly, president of Bell Telephone Laboratories, chairman of the National Research Council, Robert M. Knobell, Massachusetts Institute of Technology, and former associate director of research at General Electric Co., and Clark E. Wilson, president of Battelle Institute and AFCAC ad hoc.

Former President Dwight D. Eisenhower, chairman of the Commission on Organization of the Executive Branch of the Government, transmitted the report.

## Group Asks 15 Research Changes

Here are the recommendations of the Hoover Commission Task Force on Security on Research and Development work in the Department of Defense.

No. 1. That the Department of Defense review and assess the effectiveness of the security classification plan of numbered operation of the other of the Assistant Secretary (R & D) and the Assistant Secretary (Applications Engineering) with a view to their integration into the office of the Director as soon as possible.

No. 2. That the authority of the Secretary of Defense be withheld by appropriated funds from the research and development project from the branch and individual used to prosecute inquiries of the progress of the three departments to prevent unnecessary duplication, and to promote effectiveness and efficiency in the use of research and development funds.

No. 3. That the office of the Assistant Secretary (Research and Development) give emphasis in its consideration of research and development programs in preventing unnecessary duplication, and that the Assistant Secretary (R & D) and Assistant Secretary (Applications Engineering), through stand committees for production procedures prevent duplication in weapons.

No. 4. That the Assistant Secretary of Defense (R & D) appear before the applying congressional, reporting directly to him, of outstanding basic and applied scientific

invention of research and development.

That the office loses a small staff trained in science and technology and experienced in the operation and administration of research and development.

No. 5. That the level of basic research in the Department of Defense be significantly increased above its present \$20 million level of annual expenditure.

No. 6. That where choice is possible, the positions of research and development should be performed at that place in the nation where they can be done most effectively and with the greatest efficiency.

No. 10. That the Secretary of the Army and the Chief of Staff give strong support to the research and development work of the Army Research and Development Board of the Defense Department. The staff to be adequate in size and of highest possible professional competence in research and development. The staff to be given priority and effective administrative support in its operations in meeting its responsibility for control, integration and coordination of the Army's R & D programs.

No. 11. That the Secretary of the Navy and responsible heads of Navy offices give their administrative support to the work of the Board of Naval Research in coordinating and integrating the development program of the Navy. A task adopted in size and of highest research and development competence be prioritized, and progressive recommendations of Office of Naval Research be implemented.

No. 12. That each of the military departments make a regular examination of their giving funds for technical efforts. If used to be in the task force inborn scientific experts expand their programs to provide grants-in-aid for an expanding number of defense toward research and development.

No. 13. That the three military departments review policies and their implementation on future officers in research and development. Move toward locating the areas of rotation of research and development officers to develop management, and increase the time period of assignment in a position.

No. 14. That higher levels of compensation for civil service professional engineers be established, more nearly competitive with industry, and the number of higher level civil service positions be substantially increased.

No. 15. That the Department of Defense make a clear examination of the operations under "research and development" actions, and the effectiveness of the present high efficiency in a variety of the development programs through the Military Logistic Command and the Armed Forces Special Weapons Project Organization.

## Firing Nike Guided Missile from Anti-Aircraft Launching Sites



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ON FLIGHT LINE, Nike battery moves one position at Quantico, Va., site near Washington



RADAR SCANNER (above) checks auto target and Nike missile is moved onto the site by hoists during practice firing, as practical field training of sufficiently big cities ends at Red Canyon Camp, N. M.



# Range of 6,500 Miles Claimed For TWA 1649A Super Connies

Los Angeles-Lockheed Aircraft's Model 1649A Super Constellation will have the greatest range of any aircraft ever built, according to a company spokesman.

Maximum top speed will exceed 490 mph, with maximum cruise about 333 mph. But at a rate of climb/descent of 1,000 ft per min, the plane's peak to point speed at range beyond 4,200 mi will be up to 78 mph faster than any other piston-powered plane, it is claimed.

Scheduled to start service in 1957 on Trans World Airlines, 24 of the 6,500 mi range planes will be produced for Howard Hughes (AW Apr. 25, p. 187) for assignment in TWA. Total cost, including spares, will be about \$750,000 each. The 1649A is expected to help establish a new pattern of air routes and make possible nonstop service between widely separated world centers.

Key to the aircraft's performance will be a completely new wing design and a powerful Model R-3350-2A7 Westinghouse engine with 3,100 hp, instead of the present 2,750-hp, D-335 engine in the 1649C Super Constellation.

The wing, largest of any airplane in service, will span 150 ft—27 ft more than on present Super Constellations. Total area will be 1,659 sq ft, an increase of about 700 sq ft. But wing will be much thinner. Design of the wing



New Look of the Shangri-La

Boeing's 707-320 is the Navy's first attack carrier to embody all of the latest improvements being made in the Trans-Atlantic. Modernization includes angled deck, deck catapults, high-capacity landing gear, enclosed bow, increased fuel capacity and three catapults mounted outside of the aircraft to speed aircraft launching on carrier's flight deck.

## Air France Orders 1649As

Los Angeles—Air France ordered 12 Lockheed 1649A Super Constellations this week for delivery in late spring of 1957. The order, worth \$12 million, is the second Lockheed has received for the aircraft.

By keeping with Air France policy to maintain the most advanced fleet of its craft, the company has purchased the Lockheed 1649A Super Constellation, said Henry J. Lautens, general manager for Air France's North and Central America and Caribbean Division. "It will be the only available commercial aircraft capable of schedule nonstop trans-Atlantic service both westbound and eastbound."

allows for takeoff and landing on flat paved runways.

Flying qualities also are altered. Engine thrust is held further out on the nose to reduce sound and vibration. Additional improvement is expected from the larger propulsive thrust at slower speed. The three-bladed prop will measure 16 ft. 10 in. against 15 ft. 2 in. now.

The new transport, carrying 55-60 passengers in luxury style, will be convertible to high-density tourist seating.

Fuel capacity of the 1649A will be 9,000 gal, in comparison with 6,900 gal in most Super Constellations and 7,750 gal in top tank-cladding models.

Maximum takeoff weight will be 158,000 lb., up from 137,500 lb. on current Super Constellations. Maximum landing weight will be 125,000 lb. up from 117,000 lb.

Service ceiling will be 17,000 ft., up to 17,000 ft. range. More than 10,000 lb. payload will be carried for range.

Fuel tanks will be placed inside fuselage. Hydraulic system will be 3,000 psi, with completely independent dual pressure sources and each system operating different parts of engine.

Extensive use of integral stiffening will be made in the structure.

## U. S., Britain Agree On Transpolar Routes

An agreement for exchange of transpolar routes between Los Angeles, San Francisco and London has been reached in negotiations between the American and British governments in Washington.

In a week of discussions, the group decided on reciprocal rights for American and British carriers on the polar routes between the West Coast and England. The agreement also agreed on reciprocal authorizations for the New York-Narita route now operated by British Overseas Airways Corp.

Discussions were broken off when the British group, headed by Sir George Colbeck, Deputy Secretary of the Ministry of Transport and Civil Aviation, left for the International Civil Aviation Organization in Montreal.

The U. S. delegation was headed by J. Paul Barringer, director of the airway division's Office of Transport and Communications, and Chas. Garrow, a member of the Civil Aeronautics Board.

The Washington discussions have left unopened a number of controversial route questions. A chart British airways is drawing around the world route by flying over the United States using New York, Chicago and a West Coast port on a London-Sidney route.

Routes sought in American carriers include trans-Pacific flights between London and Rome and others in the east to implement a plan now recommended Trans World Airlines to the CAB. The plan, now under consideration, connects Frankfurt and Zurich, thus connecting London and Frankfurt with TWA's main line to the south and east.

Another right sought by an American carrier is a route of Northwest Airlines into Hong Kong. That route was granted to Northwest by the CAB in the trans-Pacific route case, but it then sought an authorisation from Britain.

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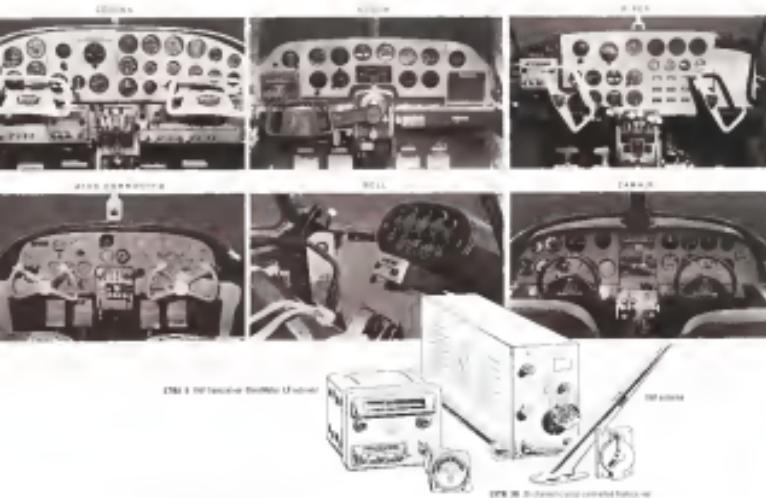
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## SAC to Integrate Spanish Bases Into Global Complex by 1957

Madrid-U. S. Air Force installations in Spain will be sufficiently near each other within two years to be integrated, Secretary of Defense announced today.

Two of the four existing bases under construction, Torrejón and Seville, are scheduled to be fully operational by 1957. Two others, Málaga and San Pablo, will be far enough along by then to be available for emergency use.

Additional bases are planned, but not in Spanish colonies. The Spanish government has authorized preference votes with on three new sites: Almería (between Seville and Cordoba), Los Llanos (Alicante) and Leon (north of Barcelona).

### Self-Sufficient Complex

The Spanish bases complex will be an entity in itself. According to available information, a SAC Air Division Headquarters will be established here. Bases will not be permanently assigned in what might become known as the Iberian Command, however. They will follow the present time rotational training system, rotating bases for limited administrative periods.

U. S. Air Force representatives will, if necessary, cover Spain against emergency use of the new American equipped integrated Spanish Air Force. It will be able to take off. At present, Spain's air force's cover consists of about 100,000 personnel.

Under Sec. of Defense, Gen. Curtis LeMay, the defense ministry is making

available 15,000 foot runway

and possibly long-range fighter aircraft

as well as the adjacent

Seville airport for the base.

Eventually SAC bases will operate out of Valencia, while interservice and possibly long-range fighter aircraft will be stationed on the adjacent Seville airport of the base.

### Laboratory, Supply Depot

With at Málaga, Almería, Seville, bases will be held up because of adverse local experience. Construction, when it starts, will be from scratch. There is nothing now but fields, olive trees and a few huts. Contracts totaling \$2.5 million for building an 11,000-foot runway, taxways and part of the parking areas were awarded May 18.

Meanwhile, work has started on an offshoot auxiliary building on the edge of the Málaga site. The road connecting Málaga with the Seville highway is being improved, it is in such a bad state at present that it can handle no heavy traffic. Once begun, first-phase construction at Málaga is to be completed in 370 calendar days.

The fourth base, at San Pablo, will not be for combat operations. It will

be U. S. SAC bases for its own use; • Western in Central and Southern Spain is clear road of the way.

### Advanced Construction

Construction work is most advanced at Torrejón and Seville.

At Torrejón, 15 miles east of Madrid, an existing runway is being extended from both ends to a total length of 12,000 feet and broadened to a width of 200 feet. An overlay of asphalt and concrete will bring it up to strength requirements. Work has started on other paved areas, satellite tanks, and parking areas to be provided with service facilities.

Contracts for the "first phase" construction program were awarded Sept. 13, 1954. The job is scheduled to be completed by mid-March 1956; the base will be available then for semi-operational use by SAC's heaviest bombers.

The Seville base will be an two-aircraft Seville Field, presently a Spanish Air Force establishment and Seville's civil airport, and Valencia's whose projected 15,000-foot runway and complementary installations will all in the down-the-road stage. Seville's space and frame development began Sept. 24, 1954, and also is to be completed by Dec. 15 this year, but reached the cornerstone-laying phase May 15.

Eventually SAC bases will operate out of Valencia, while interservice and possibly long-range fighter aircraft will be stationed on the adjacent Seville airport of the base.



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## "Big Stick" . . . jet age version

### TEMCO HELPS BOEING BUILD B-52 "RETALIATION" FLEET

Thunder of the Stratofort's eight jet engines is heard clearly at conference tables today, for this sleek giant can, by refueling in flight, strike with an H-bomb load at any point on earth. The threat of this fearful retaliation is impossible for an aggressor to ignore. The Air Force has ordered a fleet of these planes and they will have performed their mission to perfection if they never have to drop a bomb in combat.

Producing planes fine enough to preserve the peace is an awesome responsibility for our aircraft industry. Boeing-Wichita, in starting second aircraft production, called confidently upon TEMCO to produce a major component of the vital B-52, for previous Boeing sub-contracts on the B-47 Stratofort and firmly established TEMCO's reputation for producing a quality product, on schedule, at the lowest possible cost.



Towing up for the B-52 job, these TEMCO workers are building the huge rigs in which major fuselage sections will be fabricated.



**ENGINEERS** If you are interested in a problem with a growing weapons systems organization, write full particulars to E. J. Heron, Jr., Engineering Personnel, TEMCO Aircraft Corporation, P. O. Box 6191, Dallas 2, Texas.

function as a supply center across other SAC installations in Spain. San Pablo is Seville's airport and is well provided with serviceable runways. SAC's Air Materiel Depot, as it will be called, will be in the planning stage.

Construction of a 10-inch 30-mile-long fuel pipeline to feed the air bases started at the end of May. Extending from the now-building Naval Port and Air Station at Rota, near Cadiz, the pipeline will terminate at San Pablo. It will be laid in a 10-foot trench with pressure hoses and over others that may be built. Building time: 455 days. Self-contained tank trucks will have a total fuel storage capacity of 45 million barrels.

Protective major roads are being built to begin paving in June.

#### Planning Progress

Overall coordination of the bases program in Spain is the responsibility of Maj. Gen. Augusto W. Kammel (USAF), chief of the Joint United States Military Group here and direct representative of the Secretary of Defense.

Planning is done by Architects-Engineers Spanish Bases (AESB), a consortium of four American architectural engineering firms. Selected by a joint Navy and Air Force board, the four are McMillan & Associates, Inc., Parsons, Brinckerhoff, Quade & Douglas, Inc., Shaw, Motes & Dolan and Parsons & Luskens.

Supervision of construction is in the hands of the U. S. Navy's Bureau of Yards and Docks. Plans are being drawn by Brown-Bovis-Wald (Brown & Root, Inc., Raymond Concrete Pipe Co., Walsh Construction Co.). Sub-contractors will be Spanish firms if they are able to do the job. Spanish labor is employed.

Under the terms of the contracts signed with Spain Sept. 26, 1953, the bases are to be operated jointly by Spain and the United States. The bases cost a fee for a period of ten years extendable by mutual agreement for two successive periods of five years.

Warfare use of the bases by the U. S. Air Force is subject to Gen. Feltz's consent. Article 3 of the Spanish-American Defense Agreement says: "The time and manner of wartime utilization of air bases and facilities will be mutually agreed upon."

#### Convairs Replaced

Pan American World Airways is replacing Convair with DC-6s equipment on its Manila-San Juan run. The Super 6 will make daily flights via Camaguey, Maracaibo Bay, Kingston, Port of Spain, Barbados and Cebu City.

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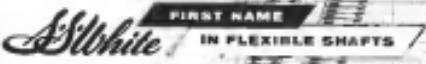
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GOODYEAR PROJECTS cover a wide range, including liaison GA-400B copier, aerial program (top right), interceptor missiles (bottom left), and...



HIGH-SPEED TOW TARGET capable of 900 mph. Right, linked: a B-57, and extreme plastic production, such as columns of eight.

## GAC Banks on Diversity and Research

By Henry Lefer

Along—The aviation industry that depends largely on subcontractors is unique, what has a man braced on a high ledge. Any cables shift in the wind may trigger his fall.

In the aircraft industry, these shifts are likely to be the result of changes in defense procurement.

Completion of prime contracts usually creates out associated subcontractors. Or a prime may find that out-hands leave him with insufficient work for his engineers and production personnel, and induces subcontracting to keep his over-head low. Or the prime may feel that he can maintain better profit margins by doing the work in his own shops.

GoodYear Aircraft Corp., which de-

pends a large extent on subcontractors, has felt these sudden shifts great. The sales volume, now by GAC's measurement, is diversification and development of the company's own products.

A prime part of the solution is a constant attack against what T. E. Knowles, vice president and general manager, calls the "factor of ignorance," something off the rough edges that keeps us from getting top performance and value from present materials, techniques and structures.

### Covers the Field

GoodYear Aircraft Corp. is a wholly owned subsidiary of GoodYear Tire & Rubber Co. Although the company does not break down its spending fig-

ures for subdivision and division, some indication of GAC's size may be gathered from employment statistics.

The GoodYear Corp. had 96,000 on its worldwide payroll in 1974, with about 75,000 in U.S. plants. Of that total, GoodYear Aircraft employed 12,000—30,000 at Akron and 2,000 at Litchfield Park, Ariz., and Bellwood, Illinois.

So, perhaps a fair guess would be that GAC was responsible for over 50% to one-third of the company's 1974 sales of \$1.3 billion. GoodYear Tire & Rubber had its peak year in 1953, when sales totaled \$1.2 billion, but on the basis of first-quarter reports may exceed that this year.

In keeping with its policy of diversification and research, GAC maintains a stable staff of engineers. A glance at



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An aircraft on wings, the USAF's newest jet fighter, the F-102, flies through waves of supersonic winds and parts like fighting pieces of a thousand bolts of lightning!

But, new developments in aircraft make new demands on man. And, to help train the pilots who will fly this dangerous jet in the defense of America, Link has developed the first F-102 jet flight simulator.

Months of research were necessary, but now, USAF's first train on the ground in conditions precisely duplicating those of the plane's air performance. Electronically, the Link simulator re-creates all the visual flight characteristics of the F-102. Pilots will pilot a familiar craft when they feel "I'm the air!" In this vital air-defense weapon.

As more aircraft hospitals, Link keeps pace with progress. Whatever men are planning today to conquer tomorrow's skies, you'll find Link.

As more schools hospitals, Link keeps pace with progress. Whatever men are planning today to conquer tomorrow's skies, you'll find Link.



LINK SHOWS FUEL TANKS made by Goodyear for a single KC-97G aerial tanker

the *Italy Warbird* column of *Alas* newspaper indicates that outside aircraft companies are aware of this and eager to offer sites of these engineers a new home.

GAC's diversification program has carried it into many fields. The company's present products are: a wide, Nike missile booster cases and Gads electronic boxes.

As a subcontractor, it produces cases for nearly every plane being produced and many aircraft accessories: doors and doors, door mechanisms, optical cameras for bombers and fighters, metal tanks for fuel in flying tanks, droppable metal fuel tanks, mobile graduate systems, ground water extraction and ground handling equipment.

The company has developed an operational flight trainer for a military aircraft. It has two jet thrust chambers under development—one hydraulic and one mechanical. The military is using it as high-speed all-weather target and as an ejection escape capsule for cases of emergency aircraft. The company is running tests on an aircraft developed overseas. It is forming a research and planning program in jet-wing protection coating, including space vehicle application.

## Stress on Plastics

GAC has made heavy investments in plastics. Recent installations of five new presses—200 ton, three 100-ton and one 100-toner—make an example of the company's continuing drive toward diversification.

In addition to its major plastic products, Goodyear is producing all-weather, flame-resistant plastic belts for aircraft. It has a contract to produce glass-plastic antiseize torque. It is making glass-plastic furniture, happen for International Harvester, from the same plastic.

A host of the company's plastic products, believed by Goodyear to be among the largest in existence, division an impressive number of projects.

GAC produces the cockpit canopy for B-47 Strategic bombers, by Boeing or well as Douglas and Lockheed. Laminated Plastic, consisting of two outer layers of Rokon & Hause's Pliot 55 or metal to a Borelli filer (to make the canopy shatterproof), it gives its re-

quired impact under heat and pressure in a stretching. Then Goodyear stretches the metal frame and tries and covers the optically clear canopy with a protective plastic to guard against scratching and damage before installation.

A new Goodyear development division is used for windshields constructed to make aircraft canopies shatterproof. GAC makes Pliot 55 sheet-molded by stretching it 100% in length and width. The Pliot 55 sheet has already been made thin for the Republic F-84F, working with a thin, thick sheet of material and reducing it to a thickness of 1/16 in. Haskins claims the stretching R. W. Donnan, assistant manager of the range and business division, says the process will also work with other thermoplastic materials. Successful half-scale tests have been conducted with Convair's Avenger.

Goodyear designs and builds the canopy for the Northrop Superjet, from the B-57C model onward. The company says there have been no insurmountable problems (OK) from the trial in the three years the canopy has been installed. Superjet also manufactures canopy for the Convair F-107 (now suspended) and the Republic F-84F, and designed and built the elliptically shaped canopy used on Convair's vertical jet, the XFY-1 Pogo.

Link Aviations uses precision engineering, says GAC's know-how in combining plastic and metal structures enables it to build the complete canopy "package."

Goodyear has designed a plastic escape panel to permit downward ejection from the B-57. The panel has to be made strong enough to serve as part of the Strategic's belly, yet weak enough to rupture harmlessly when hit by the operating ejection system. The panel has been used in Air Force for reduction.

Mass plane plastic surfaces now flying are GAC products. In addition to the panel belly set on its own S-type subcarriers and the dorsal midplane (the AEW aircraft mid-winging) ZPG-7W plane, Goodyear makes reinforced plastic surfaces for the Douglas B-52 bomber, Convair Vought F7U-3 Cutlass, the Douglas C-124 Globemaster II, the B-47, and Grumman's SIF self-Lifter (for which GAC also makes

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New Sprague filters are a complete series of miniature noise filters for high-frequency filters for audio and mobile telephone and television applications or ranges from 0.1 megacycle to 20 megacycles for both 120 volt and 125 volt 400 cycle service. The filters are available in 100, 150, 200, and 300 megacycles for operation at temperatures from -40°C to +40°C. All designs are hermetically sealed with glass-to-ceramic insulation and ceramic.



SEDA electronic beam was originally developed by Goodyear Aircraft to meet its own needs. Seda is a NASA supplier.

plane. In case for the vertical exhibit (6), GAC also produced insulation for Orman's 836.

The radome consists of two low density, static, matte of glass-fiber-reinforced polyester resin molded in matched dies, with a flange in place over the radome, and a flange in place over the radome. The radomes are generally cured under heat and ultraviolet lamps which trigger a photo-sensitive catalyst that starts polymerization. The insulation is usually applied within 85°C.

To seal these radome components to non-ceramic, GAC developed a special coating, which it sold 23.55.

Among GAC's plastics insulation products is a production of Lockheed Park's high strength laminated plasma blades for a sonic windtunnel fan, the first successful application of the material for this purpose, according to the company.

## Antennas & Electronics

In response to GAC's own needs, company engineers designed and built the Geda (Goodyear Electronic Devices) antenna system for the company and its associated equipment. Now it is being sold to manufacturers and industry around the globe. Price of a basic Geda is about \$15,000. Complete installation, including the basic GN-215.3, 1000-watt operating power plant other units, can be about \$41,000.

The 13-gigahertz (12th order) differential equation involving 10 radial conditions. In utility is expanded by addition of the NT linearizing scaling equation, incorporating as many as ten NTCA multiplex units, RS 1600 data recorder or R3 two-channel portable recorder, 111 noise photos and 311 impedance bridge.

Among the problems Geda can solve are those dealing with stability and dynamic performance, transmission line design, waveguide insulation and end feed, jet engine coating, helicopter noise and failure design, dynamic stresses of moving parts, fluid and heat flow, hor-

DOW CORNING  
CORPORATION

# Silicone News FOR DESIGN ENGINEERS

## Founder Celebrates 25 Years' Service To Silicone Industry

In 1933, Dr. E. F. Hyde first started his investigations into the field of organic silicon chemistry. His work, which preceded that of any other scientist in this country, led to the first commercial production of silicone.

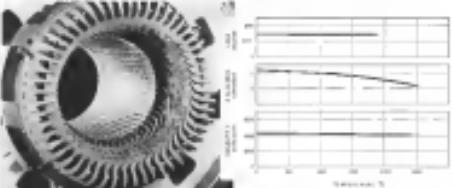
Frank Hyde received a master's degree in chemistry from Syracuse University in 1924. He then enrolled in the graduate school of the University of Illinois and received his Ph.D. in organic chemistry in 1927. Dr. Hyde's first faculty position was in organic chemistry, his interest in basic organic chemistry, for quite two years to a post Doctoring Fellow at Harvard University under Dr. J. B. Conant.

Dr. J. F. Hyde

Hyde's work in the field of silicone polymers began the day he was hired by Dr. E. C. Sullavan of Corning Glass Works in 1928. His first project was to explore the possibility of incorporating organic chemical groups into glass compositions to increase their shock resistance and flexibility. His investigations led directly into the work done by Prof. F. S. Rogers of Nottingham University (England) in the field of organopolysiloxanes. Applying his creative imagination to Rogers' findings, Hyde produced silicone polymers with the very properties that he originally predicted the silicones had when away from the presence of organic polymer chains.

Frank Hyde carried on basic exploratory work in the silicone field in Corning until 1933. He then transferred his laboratory to Michigan, where he is closer to major silicone companies. He joined Dow Corning Corporation when he concluded his study. His research ability in producing more and better silicone products

At this time, many people felt in a position to congratulate Dr. Hyde. The man who was first in the world to produce a useful silicone was an unknown hero. An industry was founded by E. C. SULLIVAN



## ALLIS-CHALMERS ANNOUNCES ALL-SILICONE-RUBBER INSULATION FOR LARGE MOTORS AND GENERATORS

Allis-Chalmers Manufacturing Co. has announced development of the first all-silicone-rubber electrical insulating system for large motors and generators. Known as Silco-Flex, the new Class H insulation insulates the life and efficiency of rotating electric machines by providing greater insulation protection and maximum resistance to vibration, moisture, shock, and vibration.

Made with Silco-Flex, the Dow Corning silicone rubber, Silco-Flex is claimably superior in all types of insulation applications. As shown in the figure, dielectric strength of 1716 volts short circuit 24 hours at 25°C measures substantially greater at a temperature span ranging from 0 to 250°C. Dielectric constant decreases gradually from 2.2 at 0°C to 2.0 at 250°C.

In manufacturing, Silco-Flex insulation is applied to the conductor and vulcanized into a homogeneous mass by the application of heat and pressure. This produces a continuous and impervious dielectric barrier which prevents a flexible, moisture and heat resistant, well over the entire coil insulation including end turns.

Silco-Flex insulation is expected to change some of the major application problems in the utility and industrial fields. For example, power induced shaft heat factors, for example, the adverse effect of atmospheric-temperature change and fly ash will have little effect on the resilient all-silicone-rubber.

## Design Edition 10

DOW CORNING INSULATION Dept. 8000  
Midland, Michigan

Please send me more data on number: **11**

NAME: \_\_\_\_\_

TITLE: \_\_\_\_\_

COMPANY: \_\_\_\_\_

STREET: \_\_\_\_\_

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Provides a heading reference with a drift rate of  $1/10^{\circ}$  per hour when used as a directional gyro.

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A brochure describing the ARMA Subminiature Gyro Compass will be sent to personnel engaged in military applications, by writing Dept. 103-3, ARMA, Garden City, New York. A division of American Bosch Arma Corporation.

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**ARMA**

ADVANCED NAVIGATION SYSTEMS

ing and weather stations and the control

GAC is a basic subcontractor in the systems field. The company has designed and is building the Control Unit for the avionics for the F7F's high fighter ratio, with its 50 ft. re

lease. Another project is the antenna for a B-52's surveillance ground radar. Strong enough to withstand 75 knot winds, this unit can be "locked down" and a light enough for an ejection.

Goodrich is also working on missile guidance systems and produces some large tubes.

**Meteo & Missiles**

After some hiccups, the company has been permitted to reveal its part in the Navy's missile program. Both the Alava and Lockheed Park plants are involved. Meteo units and other parts of the gear bags and envelope at Lockheed Assembly is in the bags, 76-1800 sq. ft. each at Alava.

In locking the booster case, GAC rolls a sheet of high strength steel and a cylinder and seals weld it. The company's ability to produce a sheet of strength equal to the original sheet played a major part in leading the order to Bob W. Richardson, vice president.

The company built a steel frame plant at Alava with its own funds to handle Nike production.

Goodrich produces wings and canopies for the T-33 trainer, under subcontract from North American.

This unit is down at the Lockheed Park plant.

Under present schedules, the contract will extend into 1957.

Boeing's KC-135 tankers carry the fuel for night refueling of planes flying in Goodrich built metal tanks. Each plane carries 15 tanks, of several sizes.

In addition, GAC makes parasolized wings for the B-57.

**Airship Program**

As far as the production of airships for the Navy is one of Goodrich's major production programs. Both the Alava and Lockheed Park plants are involved. Meteo units and other parts of the gear bags and envelope at Lockheed Assembly is in the bags, 76-1800 sq. ft. each at Alava.

The company is now working on both F (about, short stage) and P (patent, long range) airships for both land and aerial early warning systems.

The dirigible-GAC engineers work at the word "blimp"—an airship rigid construction the nose and tail sections are rigid, the large biting section in the middle is non-rigid. The car is supported by a system of stay cables lead

through the top and bottom of the ribbed fabric envelope.

The metal framework of the control car is built in steel monocoque, which are then woven. Goodrich's Bonduite sandwich—the core aluminum alloy facing with halo monofilament extruded in the car.

**Sandwich**

Goodrich produces its Bonduite products with various face and core ratios and with both space and basic good sandwich cells.

Good is made of cold rolled steel, aluminum foil, stainless steel, fiber glass, paper or cotton honeycomb, and laminated or cellular material. For military applications—structural and non-structural applications, stainless steel and titanium (where high strength and heat and corrosion-resistant are required), magnesium, the durable, high-strength aluminum, insulating-coated glass cloth (resinless), and paper (baggage racks, partitions, non-structural applications).

GAC and Goodrich (parachute division) work on primary wing structure on the GA-22A Drake banner transport design. The company says the Drake is the first and second using house-cloth material for primary structure to get GAA certification.

As a subcontractor the Parachute in

**IN GOOD HANDS** From design to mass production, Security Parachute Company can provide automated parachute systems for any purpose... for the medical needs to the largest sport banner. Your correspondence regarding research or production is invited!

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WORKING only from the basal side, operator sets the fast aircraft Rivets... up to 30 a minute.

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Thirty minutes—use men—ancounted dollars... saved in just one riveting operation through the use of DuPont Aircraft Rivets.

"How?" you say? Ask Kevner Metal Products, Inc., of Bristol, Pa., manufacturer of parts for the Republic F-84-F "Thunderscak." Before switching to DuPont Rivets, it took two men, forty minutes to fasten patch plates to drop-pen formers in the troublesome "bird-cage" sections. Now one man does the job in ten minutes—and with better results. No more costly removal—Rivets need no damage-causing breaking bars.

In fact, Rivets are so easy to use, 30 to 30 minutes can be cut down "bliss." Simply insert riveted plates, apply heated crimp to head. Rivet expands, fills holes almost instantly, locks parts solidly together. That's all—an inexpensive after-finishing required.

### DU PONT AIRCRAFT RIVETS



A Product of DuPont Research

BETTER THINGS FOR BETTER LIVING... THROUGH CHEMISTRY



3. Rivet is inserted in drilled hole. Cross section shows rivet in sheet containing explosive charge.

3. Heat is applied to rivet head, driving it into sheet until it is in place.

the H-21 helicopter program. Goodbar used balloons available extensively in the cockpit's shelf.

#### Other Projects

Among recent GAC projects that have required air bags:

- Helicopter recovery system: The all-silient 2,400 lb craft can be lowered behind a B-47 at speeds over 500 mph. It means of offset towing no one side of the B-47, close simulation of a jet fighter plane is permitted.

The target ship lands on air-bags; recovery is delayed by a drogue para chute when the tow cable is released. Recovery is as possible.

A small diesel air-motor generator provides power to operate air-bag-based devices on the craft.

The tow target, designed and built by GAC in cooperation with the Armament and Tow Target Unit of WADC's Equipment Laboratory, is now undergoing extensive Air Force tests.

- Chin-man copter: Goodbar says the military is interested in the GA-400R, chin-man copter built with its own money. It could be used as a mobile vehicle or for medical assault by ground troops (AVW Mar 31, p. 7).

Key consideration in design of the 400 lb. craft was to come up with an arm that could move into production quickly and easily, in emphasis was put on use of commercially available materials. Powerplant is a water-cooled 25 hp Johnson Seabine outboard motor, stepped up to 35 hp. The arm itself is of welded aluminum tubing supported by dual stagger tubes as stemmers and slighting gear.

Maneuver arm has three standard wood handles mounted on a two-tier frame that can be removed for transport. The three-bladed tail rotor, operated through radar cables connected to its collective pitch mechanism, is of formed aluminum sheet. Overrunning centrifugal clutch gives smooth start and free wheeling on low of power.

The copter, capable of 60 knot speed was designed, built and flown in 18 weeks. GAC's Paul Ziegler • B-52 towbar: GAC's Atlanta plant has a contract for production of B-52 Strikeforce tow bars. This is the first time Lockheed Fokker has made ground-handling equipment. Other projects of the plant are production of optical cameras, reinforced plastic parts, ship superstructures and gun bags, electronic subconcentric work and T-25 assemblies.

#### Executive Fleet

Goodbar Tire & Rubber uses one of the nation's largest fleets of exec aircraft, between 10 and 40 at present. The Aviation Products division is responsible for the fleet which

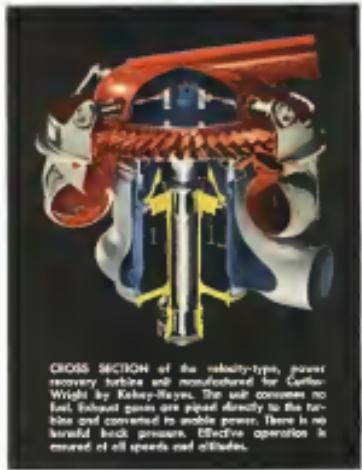


**CURTIS-WRIGHT**  
Turbo Compound Engines  
are in use by 50 World Airlines  
plus leading military aircraft.

## Kelsey-Hayes helps put 20% power bonus into Curtiss-Wright engines

One more example of  
Kelsey-Hayes diversity of work for  
major industries throughout America

Any way you translate it—20% longer range, 20% less fuel, 20% more payload—power recovery turbines on the Curtiss-Wright Turbo Compound engine mean greater operating economy. The entire power recovery unit—requiring 2000 close tolerance machining operations—is manufactured to highest engineering standards by the Kelsey-Hayes Wheel Company, Detroit 32, Michigan.



**CROSS SECTION** of the velocity-type power recovery turbine unit manufactured for Curtiss-Wright by Kelsey-Hayes. The unit consumes no fuel. Exhaust gases are piped directly to the turbine and converted to usable power. There is no thermal load; pressure, effective operation is assured at all speeds and altitudes.

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includes Fort Lauderdale, a DC-3, a twin-engine Transoceanic, a Bazaar, Cessna, a Stevens, an amphibious Dacke and two Drakes. Goodyear also has a number of aircraft on loan from the government for special projects. A crew of 11 mechanics and radio specialists maintains the fleet, too.

In addition Goodyear maintains two 127,000 cu. ft. blimps—the Enterprise and the Ranger.

The Aviation Products division, which comes under the parent company and is separate from Goodyear Aircraft Corp., includes among its products aircraft landing, wheel, tire and master cylinders, landing units for helicopters and fixed and rotary aircraft; hydraulic systems; Aircraft hydraulic fluid; aircraft fuel and lubricating fluid and oil cells; propeller and wing de-icing and aviation-related rubber products.

### Soviets Build Up Industrial Base

Two short reports from official Russian sources indicate the size of the industrial base for Red power: • Aircraft production has more than doubled since 1951.

• Airport terminal construction has been approved for 20 major Russian cities.

The government newspaper Izvestia says aircraft output increased 148% from 1951 through 1954 (the first four years of the 6th Five-Year Plan). For 1955, a further increase of about 10% is planned.

A U.S. government survey of Soviet blue economy estimates Russia's aluminum output for 1952 at 215,000 metric tons.

New airport terminal buildings will be started in Marx, Stalingrad, Adler, Frunze, Nikolaev, Tbilissi, Alma Ata and Chelyabinsk during this year as part of an ambitious airport construction program at high traffic points.

Last year Russia completed terminal buildings for stage-Kulm, Vvedensk, Krestovsk and Khilovets on the trans-Siberian route from Moscow to Vladivostok.

### 600F Oil Filter

Aircraft Parts Mfg. Inc., Glen Cove, N.Y., has been awarded an Air Material Command development contract for an aeronautic hydraulic oil filter designed to operate at 600°F and meet MIL-P-85544, spec for 10 micron removal. Unit will employ Micro Metallic Corp.'s Baghouse filter media.

APM also has set up a glass bead filter calibration service. It employs 80% polymerized sand to be granular over the 5-60 micron range.

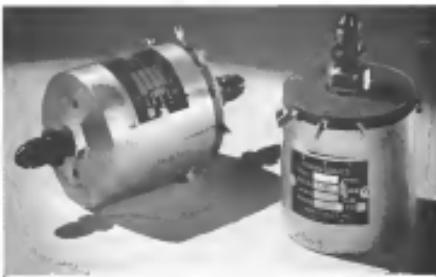


Illustration is approx. two-thirds actual size.

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*This is 2½ times the acceleration and 4 times the frequency range of Paragraph 4.7.1, MIL-E-5272A.*

No vibration mounts or other trouble causing gadgets are employed to accomplish this. The resistance to shock and vibration is built in the instrument mechanism itself. For further information request technical data on Type 75 BARORESISTORS.

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F4D PHANTOM goes off in maneuverability at altitude, good leading characteristics

## Ten-Minute Killer Mission Guided F4D Skyray Design

By David A. Anderton

A ten-minute mission, those of you may remember, the range of the Douglas F4D Skyray, the Navy's first aircraft with U.S. Naval air arm to provide top cover for carrier task forces. Its primary mission is to kill enemy bombers making 500 knots at 40,000 ft. Before they reach the drop point for an attack, say the carrier or the area being protected.

Built into the sleeked delta layout of the Skyray is the capability to climb to 40,000 ft in less than five minutes and to follow this climbing performance with fast rates of combat at altitude and maximum power.

Coupled to this high-altitude flight is spaciousness in the unpressive performance of the intercepts of low altitude German Heinkel 111 bombers. Climbing 728 ft/s and the Douglas fighter also holds the 30-min speed record at 753.4 mph. Both records were set in an intercept mission near the 100-ft altitude mark, and both were set with the experimental airplane powered by a Westinghouse J46-WT 8 plus afterburner.

Production models are equipped with the Pratt & Whitney J57-P-10 turbojet with afterburner. On the first flight of the first production airplane with that

engine, Douglas test-pilot Bob Balon flew through Mach 1 in straight and level flight. On another flight, the plane went from a standing start to 10,000 ft in 53 seconds.

### Configurations

The problem of the F4D is its chief recognition feature and one reason for its performance. In using a highly steep, low-impediment profile, Doug, the aerodynamicists bought their bear compaixs a low drag for speed, low wing loading for altitude maneuverability and good stability and control qualities at the approach and landing speeds associated with carrier operations.

Gross wing area of the Skyray is 517 sq ft, with an engine gross weight ratio 20,000 lb. For normal operational constraints, the half-cell wing loading of the F4D is about 35 psf. At the start of combat, this loading will have dropped to a minimum around 24 psf.

Trimming pitch control, elevons and trimmable leading edge slats are fitted, and these are four air brakes placed on upper and lower surfaces near the hinge and wing leading edge.

Because F4D is subject to a time effect by design, the flying qualities of David A. Anderton and flying Skyray. Design study begins above, but production analysis, see p. 49

AVIATION WEEK, June 6, 1955

Outboard portions of the wing fold upward for carrier storage. Wingspan of the folded surface is 33 ft 6 in.

Vertical tail is a conventional swept surface with split rudders.

Flying is also conventional, with a little more down-angle over the nose than usual. That is because of the higher angle of attack on the airplane during approach and when maneuvering at altitude.

Overall length is 45 ft 8 in. and height is 13 ft.

### Powerplant

Four separate types of engine have powered the F4D during its development since the first flight Jan. 21, 1951.

First two XPHD-1 prototypes mounted Allison J35A-17 turbojets rated at 5,000-lb thrust. The Allison engine was a temporary expedient until the first Westinghouse J46s were available.

First Westinghouse engine to go into the plane was the J46-WT 8, without an afterburner. This also was a temporary engine, intended to be a stop gap until the afterburning engine was available. The J46-WE 8, equipped with afterburner was later installed and powered a prototype to two speed records.

But some months before the records were set, the Navy had decided to switch from the J46 to the Pratt & Whitney J57 as production replacement as a matter of necessity to meet delivery requirements. The J57 was expected to have greater growth potential and lower fuel consumption because it was a more advanced design than the J46.

First production plane was, predictably, the J57-P-2 with afterburner. It is certain that later models along the line have later models of engine.

A ground warfare station, built by Arlebach, can be carried at a time, replacing the wing, balanced to a 50-50 load on each wing, balanced to a 50-50 load on the other side.

### Armament

Basic load of the Skyray is probably the standard Navy complement of four 20-mm autocannons. But seven pylons inserted under the wings and foreplane point up the extra amount of external armament space that can be carried by this aircraft.

Among those at present in the standard armament, the F4D can take any of the following:

- Six rocket pods, each containing seven 21-in. rockets
- Four rocket pods, each containing sixteen 21-in. rockets
- Two 150-gal. or two 300-gal. fuel tanks
- Bombs up to 2,000-pounds on each of the two wing pylons

Current all-weather capability of the



HIGH ANGLE OF ATTACK assumes for longer than usual down-angle of F4D nose.



SKYRAY PYLONS can carry rocket packages to supplement standard 20-mm. autocannons.



FOUR-POINT LANDING GEAR consists of normal tricycle gear and a tail wheel.



**FIG-1 IN SILENCER BUILDING** for engine starting. Ground turbine silencer at left may be used in pilotless drone for airborne delivery to distant bases

Douglas' interceptor makes use of the Aero 118° for control systems, incorporating APQ 58A radar and the Mk 16 sighting system. Further development will integrate an automatic flight control system into the fire-control unit so that the airplane will track and fire automatically.

#### Systems

The F-101 is one of the few airplanes with four-point landing gear. The rear main tricycle gear is supported by a tail wheel, necessary for the high angle of attack operation peculiar to aircraft with long swept wings. But Douglas engineers were able to save the weight of the extra wheel through reduction in the length of the nose gear and main gear.

Two independent hydraulic systems handle the full-power control of the F-101. Dual control control is available if the engine stops or if both systems fail.

#### History

The Skystreak, eight years old, in 1947, Navy's Bureau of Aeronautics had Douglas engineers under Ed Heise assign to investigate a delta-wing design as applied to an interceptor. After some time of study, the design team came up with the basic layout of the F-101 which has been changed only slightly since.

These early studies showed that there was more than plausibility inherent in developing a configuration. Model tests proved that there were three important parameters: sweepback angle, aspect ratio, and thickness.

Final selection of the F-101 wing geometry was made in 1948. Subsequent wind tunnel and flight tests have proved the characteristics of the lay out to be all the Douglas engineers hoped they would.

intermission, with extended range and capable of operating at low level beyond the radar horizon.

- Operational studies for improved combat efficiency. Among the subjects in this study were terrain avoidance during low altitude navigation, physiological effects of turbulence on pilots, evaluation of radar displays, analysis of limits of low-altitude flight, of visual radar search techniques and electronic countermeasures.

- Improvements in search and fire-control systems to make them capable of finding, identifying and destroying targets in the hands of scientists.

- Flight research on electronic enhancement of aircraft to improve their characteristics as gunnery and bombing platforms in ground and air attack.

- Evaluation studies of new offensive weapons for tactical aircraft as aerial search, fire control and guidance equipment. This phase should give comparison of various systems as well as point the way to new research.

Despite time the TAC study, the laboratory continues its activities as guided missile.

Long-range interceptors and missile vulnerability have been studied as part of a task for Continental Air Defense, and a broad study of Naval tank hunter defense has been completed during the past year.

## THRUST & DRAG

"Do we really appreciate the tremendous dependence of our nation on the scientists and engineers?" Do we fully realize that one man with an idea on how to goode an intercontinental missile to its target with accuracy a missile thousands of miles in diameter?"

"As the nation of the world come to depend more and more on scientific progress for their social, political, economic and military strength, the role of a relatively small number of men increases. Again, we must always look for people with broad minds to carry on the load. We are too cold to realize the idea that one man can make a more significant contribution than another."

"The concept that all men are created equal has dominated our thinking. To be sure, they are all equal before the law. But they are not all alike. Men cannot be treated like so many can canning of the sensible lot. The system as follows of each man in making his contributions to the world is a matter of emphasizing certain talents or being different each in his own way."

- Ground disposal of tactical aircraft.
- Studies made by CMC's new research department showed the advantages of VTOL aircraft, particularly those were a new engine concept giving constant thrust and reduced fuel consumption under evasive conditions. This may refer to the bypass engine.
- Development of a simple and accurate navigational system for bombing and



**tic  
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toe!**

In the event of surprise attack, today's new and more powerful TACF (Tactical Air Command) can now carry war to the enemy anywhere in the world—around the clock and in any weather.

Here at a glance are some of the elements that might be used in such an attack and which are contributing to the Air's new mobility and striking power.

To make a warlike major food lines are certain to become targets for initial enemy action. The Martin air-to-surface launcher makes possible such mobility and advance-area operations of the TM-51 Matador tactical missile and—if need be—of piloted jet fighters.

In addition, new versions of U.S. Air Force's B-57 bomber, a major tactical weapon, are now being developed for service.

And for tomorrow's Tactical Air Command aerial, new and more powerful Martin weapons systems are on the way.

**MARTIN**  
BALTIMORE - MARYLAND



**DETROIT RIDING TRUCK** from plant to Los Angeles International Airport for installation of engine under checklist and preparation for flight. Details: (A) nose; (B) upper side; (C) lower side; (D) pitch trimmer; (E) tail wheel.



**NEW NOSE SECTION** incorporates an scoop and nose frame (part 360) that may be locked in position to facilitate installation.

## F4D Meets Challenge of Engine Change

By Irving Stein

TORONTO, Calif.—Re-entering the Douglas F4D Skyray to take the PGEWA J37 engine was a big job. Douglas designers and production men labored for a fast result which was, the first J37-powered Skyray came off the line and fly just 13 months after approval was given in April 1953. To switch from the Westinghouse J46 (Delays of fast production place was made June 3, 1954).

In the switch, about 30% of the structure, restabilization and specifications clean underwent engineering change. Protection proceeded along with change making, so that the plane was well along the line while some of the frayed stress—strain, scope, etc.—were still in the

process of being designed.

This close liaison between engineering and manufacturing has led to a well-filled production lot.

### Major Assemblies

Structure of the F4D-1 totals down into 14 assemblies. Center wing, center wing, upper nacelle, lower nacelle, vertical stabilizer, inner and outer elevons, pitch trimmer (at trailing edge fairing), pylon, nose infills, fuselage nose, scoop and slats, radiper enclosure, dorsal panel and the (usually top of) fuselage or engine bay), fuselage (not ton longer across door) and fuselage.

All these parts are interchangeable, ship-to-ship. The degree of interchangeability, became effective with the 12th airplane.

Now fuselage estimators take into account and the nose frame, which has into the front spar. Forward of the nose frame and off of the cockpit is the radio compartment. Skin framing on the left side of the nose encloses the battery (inboard) and auto pilot (out).

While the fuselage nose is being built and complete installations made in it, the inner wings (stubs) and the dorsal panel (upper fuselage portion) also are being assembled. These four major components are fed into an adjacent assembly bay for the joining operation.

### Moveable Line

Taken out of the assembly bay, this assembled unit proceeds along a moveable



- PRE-INSULATED DIAMOND GRIP™ Terminals and Connectors for wire sizes #10 to #30, Vogel or Agency standard.
- AMPLE EPOXY Pre-Treated Terminals and Connectors for wire sizes #10 to #30.
- THERMAL™ and CARBONAL™ Terminals and Connectors. (14 AWG) for wire sizes #10 to #30, Agency standard.
- Shaded Wire connectors for simultaneous welding of connector and shield. Wire sizes #10 to #30.
- CIRCUIT-CHEK™ THREE-HOLE TOGGLE smallest and lightest connectors have crimping sizes #22-18 and #18-16 wire sizes.
- AMP AUTOMATIC WIRE TERMINALS AND CONNECTORS. (14 AWG) for wire sizes #10 to #30, Agency standard.

With these, as with all AMP products, AMP's thorough engineering results not only in consistency and precision of products but ensures greater safety in the use of the end products.

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Send today for your copy of *AMP's Creative Approach to Better Wiring Practices*.

DA-109

**AIRCRAFT-MARINE PRODUCTS, INC., 2100 Paxton Street, Harrisburg, Pa.**  
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## Along the Douglas F4D Production Line . . .



**MATING LINE** Nose, with wing and fuselage has been joined.



**DOUBLE DECK** final line, with mobile work cage inside F4D.



**F4D LINE** is arranged in two sections. Here the fuselage is turned to go down the line for final work, except for painting.



**ANOTHER VIEW** of double-deck final assembly line. Floor is mounted on elevated platforms by rollers attached to sheer rods.

able line for incorporation of wing, stabilator-wing, tailfin, gas parts, control brackets, cables, torque tubes, hydraulic units, shock absorbers, etc.

On this movable line, all personalized wiring in the nose is connected to counterparts in wing by permanent splices.

From this line, the structure moves to the wiring pit where the fuel tank and vertical stabilizer are hooked up.

At this point, installation is a two-hour subassembly completed in the nose, stabilizer-wing, vertical stabilizer and fuel tank (large box). So the nose assembly has 11,400 ft. long with 34

subassemblies such as outer wings (complete with slats, elevons and wingbox) upper and lower rudder, outer elevons on anti-wing, tank seat at outer portion of side wings, outer landing gear, nose gear.

This arrangement permits early start of nosecon operations and checklist procedures on the nose assembly line. Plane is completed on this main assembly line, except for painting.

On the main line, the structure is supported on an elevated hand platform by rollers attached to each wing slab at the middle cowlings; then, the structure thus becoming an own entity. The mobile platforms are

named for air combat experience with the United Nations in the skies over Korea, the Sabre Jet is now being supplied to other NATO countries.

Twin Coach Aircraft Division was selected as

a subcontractor for large and intricate machinings

for the F-86 as well as for North

American Aviation's other high performance

aircraft, the F-100 and FJ4.

These important assignments are typical of

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Our aircraft experience . . . our 234

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Special food wagons, serving the production personnel on the top line, save time and are convenient.

These wagons, carrying hot food, are brought to each general working area, where there is a special lunch counter. Each wagon holds 1000 meals.

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**SKYCAT IS LOWERED** from double-deck assembly line. The plane is now ready for travel to Los Angeles International Airport for engine and radar installation.

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COMPANY MAKE: *Fusel. Vis. and Pow. Express Thrust, Prop. Gasoline and Propane Engines, Prop. Leyland Diesel Engines*



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| Break Test Voltage              | 5000  |
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| Operating Temperature           | -40° C. to 150° C.  |
| Thermal Expansion               | 0.017 C. to 150° C.   |
| Chemical Resistance             | Resists most acids and alkalies                               |
| Operating Voltage               | 1500 volts  |
| Water Absorption                | 0.01% at 150° C.  |
| Effect of Acids & Alkalies      | General insulation  |
| Cold Resistance                 | 30,000 PSI  |
| Alkaline Resistance (NBS T-304) | Press 30-400 g/m² abrasion<br>resists with 0.2 percent weight |

\* Revere Revcothene Insulated Thermocouple



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Model 10-1412  
Thermocouple



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Model 10-1412  
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Model 10-1412  
Manometer

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## PRODUCTION BRIEFING

**Thermal Castparts Co., Fremont, Calif.** has moved into a 45,000-sq-ft plant which more than doubled its present investment casting and shell molding facilities.

**Special thermal cutter makes 111-in.-diameter pipe notches and averages over 1,500 linear feet of notches between gages, for a total 30,000 ft during the cutter's life.** Cutter is employed in a plasma flame cutting station which the user is held stationary and the cutter is cycled automatically inside. Anti-

backlash feature, is used to extend tool life and prevent shaft bending. Coated carbides are employed. Device was developed by screw machine and of General Electric Co., Fremont, Calif.

**Electroline, Inc., N. Hollywood, Calif.** has obtained U.S. patents on its solid film lubrication process, stated to operate in temperature range of -100° to +733°.

**Parker Construction Co., Bellmore, N.Y.** has acquired a \$41,250 mobile sawmill from Paul of New York. Assembly will be a postfaller at Newark Airport's

airmail and express building. PNYA also has granted a 10-year lease to Gulf Oil Corp. for a \$1,000 sq ft garage service site at the field, at an annual rental of about \$22,400.

**Competing Devices of Canada, Ltd., Ottawa, Ont.** has been appointed exclusive Canadian agent for Texas Instruments, Inc., maker of transistor, metal contact and specialty components.

**International Staple & Machine Co., Hemet, Calif.** has been granted national distributor by Van Ulfhak materials handling equipment by Bekaert Manufacturing Co., Sihem, El.

**Avco Corp., West Acton, Mass.** has completed new production facilities for production of Renn Gun, a cast textile fiber used in aircraft canopies and other applications.

**Baldwin-Lima-Hamilton Corp., New York** has acquired Ray-De Forest, Inc., Cambridge, Mass., industrial testing equipment and electronics firm.

**Wynn-Cordon Co., specialist in large fasteners by aircraft, has opened a office at 1651 Westside Blvd., Los Angeles, Calif. It brings in Alan T. Bostrom, Assistant to Donald E. Bostrom.**

**Engineering employees at Boeing Aerospace Co.'s Seattle and Wichita plants** accepted a new agreement that includes a 5% wage increase, six percent plus and higher overtime pay.



**CONVAIR SAVES \$125,000** annually using double-bladed percussive drill system that is one-eighth the size and one-tenth the weight of conventional percussive tools. It features a percussive motor center mounted in a housing body where the trigger is activated, the motor shaft rotates pulling the percussive drill mechanism into the shaft. The Windham Engineering Corp. tool is capable of drilling up to 1 in. diameter holes.



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*All three planetary stages operate within a single plane of standards used in gear.*

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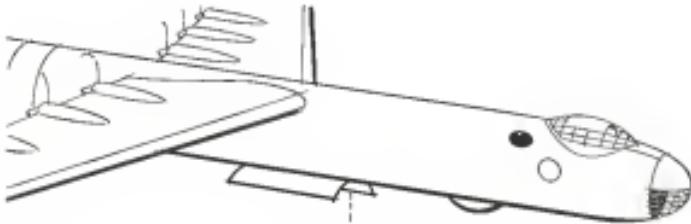
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## Italy's Aircraft Industry Passing Through Its Most Critical Period

**Power**—The Italian aircraft industry, passing through perhaps the darkest period in its history, at least can boast of highly qualified experts and courageous directors.

This is the only encouraging element in an otherwise gloomy situation, and given hope that with the aid of the Italian government and the Western Allies, the industry will weather the present crisis.

### Five-Year Plan

The industry's latest request, for a further plus of expenditure of \$100-520 million to be spent on aircraft engines and avionics and for the enlargement of experimental facilities is not at all trivial.

Oversees any that this program will not strain Italy's limited resources. They have long known that the country's strength can not be measured by its size and make it possible. However, until the time such a program could be put into effect, experts believe industry will have to look firmly to export markets abroad.

### Stronger Air Force

Outlook of the Italian Air Force is much brighter. In 1954 Air Force fighter squadrons completed their conversion to jet aircraft. Of the 25 groups, 500 plane strength, some 300 are Ro-

public 1 VVs and the remainder da Finlandia Vampiri and Fiat G.90s, used mainly for training.

In transports this depends as no group of Fiat G.119 Packets (30 planes) is still in use, dozen of Douglas

The modernization has been accomplished almost entirely through American aid, because of the damage of the long-term war and the effects of the freeze.

Each year, when the available funds have to be distributed between the several governmental departments, the Air Force commands an active congressional battle in and out of Parliament, repeat its defense position with respect to the other military services. The Air Force feels its area do not exceed the present potential of the country. It wants adequate training facilities for the flying forces. And it wishes to see made available the \$35 million needed with the expansion of Italian experts, to insure the efficiency of the existing plant of the Italian aircraft industry.

### How to Spend It

In fiscal 1954-55, the appropriation agreed on is a very critical moment of Italian house policy was fixed at 355 million dollars. Having to choose between increasing the flight forces and the continually growing number



### Tires Will Get 250-Mph. Touchdown Test

Airliner tire test, the demanded braking at 250-mph. touchdown speed, will be made by Armstrong Rubber Co. to develop tires for future aircraft. Test wheel measures 30 ft. in diameter. New equipment is installed at the Avio's West Haven, Conn., plant.

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thanked to the supplies provided by the U. S. and going orders in the Italian airplane factories, inflation handicapped the responsiveness of the industry.

A large part of the \$2 billion which had been planned for building new aircraft was subtracted from the exports appropriation.

The Italian aviation industry was one of the first in the world, before the war. The factories owned 47,500 men, 49,000 of covered space and employed 50,000 workers. At present, the covered area of the surviving factories amounts to 4.5 million sq ft while it is estimated, could accommodate 93,000 specialized workers, who could build 2,000 tons of material worth \$120 each.

When 1951 opened, it was realized that the labor force employed in the industry did not exceed 8,000 workers, mostly employed on offshore ordnance-making, spare parts and modifying or repair of some types of American planes supplied to NATO-and in building training aircraft of Italian design (10.17 planes at a time), which the Italian aviation authorities now order only when forced to do so by the workers, threatened with unemployment.

#### HATO Uncertainty

The initial estimate of the Italian authorities indicates that more work will be given to the surviving industry in the NATO plan for a commitment of Italy to assume the command of the air forces.

Industry had hoped for the plan for its maintenance of the air forces, spread on to the several European countries, dealing both with the use of the effort

and a little nation's share of the industry.

But the turn taken by political events in Europe last year has increased the distrust of the airplane manufacturers. Many have expressed the opinion that when these plans are at last drawn up, the Italian aviation industry will have ceased to exist.

#### Plane Production

The leading military-aircraft committee activity now carried on by Fiat, in Turin, and Avia, at Naples.

Fiat, besides building some models of the G.91 jet trainer, has won in the NATO competition placed between the countries of the European Coal and Steel with its model of a light fighter, the Fiat G.91.

The work of assembling the North American P-51K Sabre begins in early 1952. Deliveries have been caused by technical difficulties (the need of adjusting the machinery and instrumentation to American standards) and in the political uncertainties, it is not clear, of the Italian aviation authorities who will give the preference.

Avia has already completed the building of two models of a new plane ordered two years ago by the Italian Air Administration. The aircraft is a light fighter with arrow-shaped wings, the Sagittario II.

Avia is still engaged in building parts of the F.54 under license.

#### Treacherous Tourists

The production of light training and transport planes is still on a very small scale owing to the almost total absence of government orders.

Nevertheless some of these turned



Last of the Yellow Peril

Last fighter squadron still active in U. S. military service is made up of North American NIN-1 trainers, first mounted for operations in the Sierra Blanca, Tex. This now is a clandestine substation from the nearby U. S. Naval Air Station. The NIN-1 is the Navy's last version of the Boeing Wichita (formerly Standard) NBS series of trainers in which thousands of student pilots received primary flight training during World War II.



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Chief Project Pilot, Tom Lloyd and Fred Hughes, join on the ground, prior to departing, following an afternoon air-in-air geometry check on a fighter armament system.

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Bill Tylka, in charge of flight activities at the Center, applies his experience in the operation of flying test beds. In the Air Arm DC-3 Flying Lab, equipment gets a positive assessment of flyability.



Tom Llooyd, a chief project pilot, holds briefing with his team, discussing flight test and supervisory operations. Finding the difference between standard and actual performance is the mission for Air Arm Flight Testing.



A new fire control system is being tested in the Air Arm hangar, using the DC-3 Flying Lab as the proving ground. All equipment gets the evaluation under actual in-flight testbed conditions.



Complex equipment is being tested in a hangar, using the DC-3 Flying Lab as the proving ground. All equipment gets the evaluation under actual in-flight testbed conditions.



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can have various notable technical and commercial success stories.

\* Paggio has entered into an agreement with the Royal Aircraft Corp., Ltd., for the supply of a twin-engine amphibian, the PYML, which will be fitted in the U.S. with American engines and known as the Royal Gull. It is said that Paggio is now completing housing arrangements for a German firm to build the Italian aircraft's 5-seat version, F.149, for export and local service.

\* Morris has granted a license to a German firm, AEG, for building their touring two-seater plane M.B.101.

\* Agents worldwide have completed the test of Bell 47 helicopters for which the Italian company has obtained exclusive European rights.

Important orders were received for helicopter exports from France, Switzerland and the Scandinavian countries, it is reported. The new plane has plans for a civil twin engine jet plane, seating 70-80 passengers.

\* Nardi is negotiating with Venetair, Italy, among others, for landing gear rights to produce Bedfords for one-way flights, using their magne-matic long-life, folding-wing mechanism, the B-N335.

## Belgian Air Force Builds Seven Wings, Improves Supply of Pilots

**Brussels**—The Belgian Air Force is growing up.

There has been a notable improvement in the supply of pilots, though figures are not yet available. The last of the 1,000 sent to the United States went in the summer of 1958. Henceforth, Belgium can rely on its own to supply them.

Pilot training has moved from the elementary flying school at Gosseliescourt. After six months in that for five months to the advanced school at Kainau in the Belgian Congo, where they fly North American T-6s. Kainau has completely replaced the earlier school located at Bruxelles, Belgium.

After Kainau, pilots return to the flight school at Gosselies, Belgium, where they are trained on Meteors. They

### Seven Wings

Belgian Air Force maintains seven operational wings.

Three of them—First, Second and Third—located at Beauvechain, Chastre and Ferrières respectively—are interceptor wings, working in cooperation with the Dutch.

Wings Two, Nine and Ten, based in Flémalle, Berchem and Kainau, are transport wings forming part of the Allied Tactical Air Force.

There are Belgian elements in Germany at ATAC headquarters and at group headquarters at Wiesbaden (Cologne). Apart from these, Belgium does not maintain any bases in either Germany, though that is in preparation. The Ninth Wing are temporarily located at Colombelles and Wavre until their base, Kainau, is rebuilt and brought up to date. Wing Headquarters at Kainau (now) is still maintained and one squadron is now able to use the run way, another being temporarily located at Berchem.

The transport wings are still equipped

with Douglas C-47 Skytrains for which the Belgian company has obtained exclusive European rights.

Important orders were received for helicopter exports from France, Switzerland and the Scandinavian countries, it is reported. The new plane has plans for a civil twin engine jet plane, seating 70-80 passengers.

\* Nardi is negotiating with Venetair, Italy, among others, for landing gear rights to produce Bedfords for one-way flights, using their magne-matic long-life, folding-wing mechanism, the B-N335.

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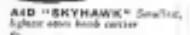
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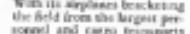
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A-4D Skyraider



Called "world's most accurate aircraft"

C-118A-R6D



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Only carrier aircraft to hold speed record

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D-558-2 Skyrocket



First plane to fly double speed of sound

A-4D Skyhawk



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Honest John



Reliable atomic or high explosive warhead

A-3D Skywarrior



At 65,000 feet, deepest carrier-based bomber

R-B-66



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YC-124B



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X-3



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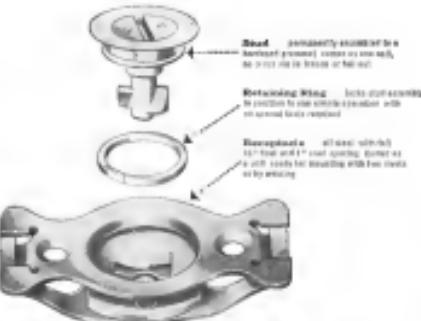
DC-4, for passenger work, and Fairchild C-119 Packets for the carriage of stores. During 1954, it was carried 1,120 passengers to Kamiss and 390 tons of stores.

It was created in 1947 but did not really become active until 1949, when it was equipped with DC-3s and Oxfords. In March 1955, it will make its two hundredth flight to the Congo from its base at Melville, Basotho.

The use of Spitfires by fighter squadrons was completely discontinued in late August.

New  
**“Style 3”**  
Panel Fastener!

PANELOC introduces Light-Weight, All-Steel Model, Setting Superior Standards in Tension and Shear at a new low price! Only three simple parts to inventory.



Exceptional durability, low price, and simplicity make the new fastener a noteworthy item. It conforms to Specification MIL-F-5581A and is interchangeable with all other "Style 3" fasteners. Let us send you a detailed catalog on the lightest, strongest, most economical "Style 3" fastener available today.

Overall Manufacturing Strategy Overall Problem Solving is an all-in-one methodology for Continuous Improvement.

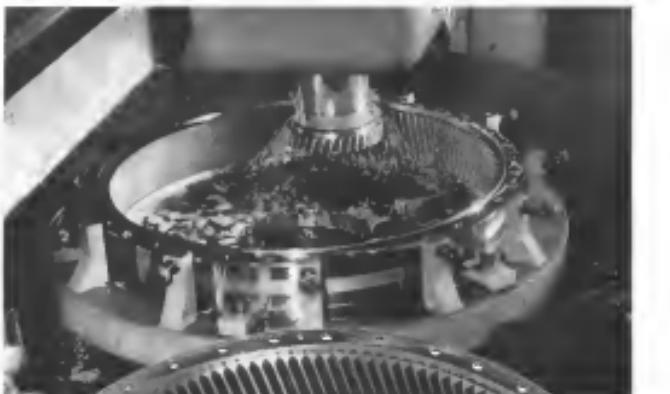
British Overseas Car Co ordered 15 340 300 Britains, eight Mark 300s and 10 long range versions of the Mark 300. 25 000 250 Britains plus 25000 for Mark 300Ls, plus an option on two more.



AMERICAN WORK June 6, 1999



and then we built



This 7 pitch, 19 1564" pitch diameter internal gear for the Shlesky 5-50 Mite Transmission

This HARD (Rockwell "50C") gear is not after heat treating to relieve gear stresses.

.0002" per tooth maximum lead error  
+.0003 — -.0003 involute error  
.0002" tooth spacing tolerance  
60 RMS finish

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## SEC Lists Salaries Of Aircraft Officials

Aerospace firms reported compensation to top officials in excess of \$10,000 for the 1954 calendar year to the Securities and Exchange Commission in following:

**Rockwell Aircraft Corp.** Robert Cross, president, \$126,125 (plus retirement contribution \$9,783). Conaird Cross, executive vice president, \$94,971. C. A. Barker, vice president, \$85,267 (plus retirement contribution \$25,979). Conaird Cross, president, \$10,183 (plus retirement contribution \$1,018). Bill Hiltbrand, president, \$68,653 (plus retirement contribution \$9,945). Elvord Quanda, vice president, \$45,768. Carl Sasse, vice president, \$58,182 (plus retirement contribution \$16,473). Elvord Quanda and Barker, \$79,229 (plus retirement contribution \$8,673).

**United Aircraft Corp.** H. M. House, president, \$135,770. Leonard Hobbs, vice president, \$148,488. Frederick Rentschler, board chairman, \$121,150. William Robbins, vice president, \$111,659, all officers and directors, \$14,629.

**North American Aviation** (from most Sept. 30) James Knobellinger, board chairman, \$170,000. W. E. Abosch, president, \$124,100. R. A. Lenzeth, vice president, \$75,000. Raymond Rice, vice president, \$62,300; J. S. Sestini, \$55,300.

**Bell Aircraft Corp.** Lawrence Bell, president, \$55,029 (plus retirement contribution \$16,315). William Kapton, executive vice president, \$61,075. Ray Welborn, vice president, \$59,328 (plus retirement contribution \$11,546); all officers and directors, \$44,914 (plus contribution for retirement funds of \$8,714).

**Sperry Corp.** Elmer Vadas, president, \$164,000. Thomas Dot, director, \$66,755. Kenneth Housner, vice president, \$98,010. John Sundstrom, senior vice president, \$110,070, all officers and directors, \$14,627.

**Pratt & Whitney Aircraft Corp.** Richard Borch, president, \$127,065 (plus retirement contribution \$14,430). Arthur Fisch, executive vice president, \$96,512 (plus retirement contribution \$14,255). Wilard Landon, vice president, \$71,511 (plus retirement contribution \$8,078), all officers and directors \$55,541.

**Convair Aircraft Engineering Corp.** L. B. Gramann, board chairman, \$61,967. L. A. Sestini, president, \$72,359. William Schwindeler, executive vice president, \$61,967. E. Clinton Towl, vice president, \$48,933, all officers and directors, \$45,933.

**Beech Aircraft Corp.** D. A. Beech, president, \$76,160. John Gaty, vice

president, \$69,149. Frank Holter, vice president, \$65,616. L. A. Wills, vice president (treasurer), Aug. 41 \$44,368, compensation for all officers and directors \$162,165.

**Convair Aircraft Co.** (from most Sept. 30) Deane Waller, president, \$57,500. William Sibley, vice president, \$57,500. Fred Beutler, vice president, \$42,000, all officers and directors, \$201,108.

**General Dynamics Corp.** management by Convair-Douglas prior to merger in purchase John J. Hopkins, board chairman and president, \$146,557 (\$46,750); Frank Pace, executive vice president, \$65,521 (\$32,900), all officers and directors, \$765,093 (\$184,517).

**Boeing Airplane Co.** William Allen, president, \$107,829; Wallace Beck, senior vice president, \$77,086; Fred Laddow, vice president, \$48,095; J. E.

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CONVAIR-Powert is engaged in development, engineering and production of electronic equipment and complex weapons systems. The Canada-Powert engineering facility is one of the newest and best equipped laboratories in the country. The work in progress, backed by Convair's outstanding record of achievement, offers excellent opportunities for recent graduates and experienced engineers in the following fields:

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**OPTIMICS**  
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**MACHINERY DESIGN**  
**LABORATORY TEST ENGINEERING**

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\*For further information on Convair and its fields of interest, write or wire, enclosing a complete resume of:

Employment Department

Convair



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TO QUALIFIED  
APPLICANTS

A DIVISION OF GENERAL DYNAMICS CORPORATION  
POMONA, CALIFORNIA

# ANOTHER McDONNELL FIRST!

## World's First Conversion Flight Made by McDonnell XV-1 Convertiplane

The announcement of the first successful conversion from helicopter to conventional airplane flight, made on April 29 in St. Louis by the XV-1 Convertiplane, is another milestone in the long history of achievements by McDonnell engineers.

Other McDonnell "Firsts" were the XFD-1 Phantom, first all-jet aircraft to take off and land on a U.S. aircraft carrier; the XHJD-1 Whirlaway, world's first twin-engine helicopter; the Little Henry, world's first man-jet helicopter; the F2H-3P Banshee, first jet carrier-based photoreconnaissance airplane. More recently the Air Force F-101A Voodoo, and the Navy F3H Demon have been developed and are now in production.

First Flight Of  
XV-1 Convertiplane



McDonnell has received new airplane and new missile development contracts. As a result, McDonnell offers engineers stimulating assignments in a variety of engineering fields working on:

**Jet Fighter Aircraft**      **Convertiplanes**  
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P.O. Box 314, St. Louis 2, Missouri

**MCDONNELL AIRCRAFT CORPORATION**



Schaefer, vice president, \$70,801; Edward Wells, vice president, \$42,564; J. D. Yost, vice president, \$42,519; all officers and directors, \$40,470.

Bryant Aeronautical Co. (See rear panel Dec. 31) T. Claude Rix, president, \$10,560, (plus retirement contribution of \$3,680); G. C. Wiesend, controller vice president, \$40,000, (plus retirement contribution of \$4,078); all officers and directors, \$100,175, (plus retirement contribution of \$18,942).

McDonnell Aircraft Corp. (See rear panel June 30) James S. McDonnell, president, \$15,086, (plus retirement contribution of \$3,016); Robert C. Chader, vice president, \$38,775, (plus retirement contribution of \$3,375); C. Warren Deale, vice president, \$34,576, (plus retirement contribution of \$3,346); Russell Perkins, vice president, \$33,521, (plus retirement contribution of \$3,171); all officers and directors, \$122,347, (plus retirement contribution of \$33,661).

Glenn L. Martin Co. George Berkley, board chairman and president, \$70,000; J. Bradford Wetherill, vice president, \$70,000; George T. Wilker, vice president, \$10,000, plus \$6,738 pension contribution, all officers and directors, \$55,730, plus \$31,043 in pension plan contributions.

Republic Aviation Corp. Mandy Peitz, president, \$101,000; Walter Rau, vice president, \$35,373; Alexander Kretsch, vice president, \$33,430; all other officers and directors, \$56,093.

## DOUGLAS A4D SKYHAWK

Reduces

Weight and

Miniature Saves Panel Space with new

**OXYGEN REGULATOR**



• This new Scott-Farrow miniature Oxygen Regulator system is doing a full-time job on the Douglas A4D "Skyhawk". The "Skyhawk" fulfills a need for lightweight fighter aircraft. This system helps solve giant problems caused by the need for pressurization.

The regulator is attached to the pilot's standard oxygen mask. Resulting in a 100% saving of valuable panel space. The regulator itself weighs only 1/4 ounces as compared to 48 pounds of the standard regulator. A small 1/4 inch male-hose replaces the regular, bulky breathing tube. These are only a part of the advantages of the new Scott miniature Oxygen Regulator system now available for military and commercial use.

Ligature compressor makes lighter aircraft



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# LEWIS

Standard Temperature  
Indicators for Aircraft

USED BY LEADING AIR LINES, THESE INDICATORS HAVE PROVEN THEIR  
RELIABILITY BY YEARS OF SATISFACTORY SERVICE.

#### THERMOCOUPLE TYPE

All LEWIS thermocouple indicators are fully cold-end compensated, magnetically shielded and are available for use with iron-constantine, copper-constantine or chromel-alumel thermocouples in all standard ranges for the thermocouple user. A few typical ranges are listed below.

MODEL 178, 216" case to AME 10481  
-50 to +300°C Cylinder Temp.

(AM 558-1A or TIA)

-50 to +300°C Cylinder Temp. ...

-50 to +1000°C Exhaust Temp. ...

MODEL 498, 176" case to AME 10482  
-50 to +300°C Cylinder Temp. ...

0 to +1000°C Exhaust Temp. ...

MODEL 198, 176" case to AME 10485  
-50 to +300°C Cylinder Temp.

(AM 558-3A or TIA)

-50 to 200°C Cylinder Temp. ...

0 to +300°C Exhaust Temp. ...



#### RESISTANCE TYPE

Accurate thermometers, these LEWIS indicators are remarkably free of voltage error, have nearly linear scales (not crowded at the ends) and are magnetically shielded. A few typical ranges are given below. Not shown is Model 468, 216" gauge.

MODEL 418, 176" case to AME 10483  
-50 to +350°C AM 558-4 or AM 559-7B

E to +130°C Oil Temp. ...

-50 to +50°C Air Therm. ...

MODEL 278, 176" case to AME 10483  
-50 to +150°C AM 558-4 or AM 559-7B

E to +130°C Oil Temp. ...

-50 to +300°C Cylinder Temp. ...

FOR BEST RESULTS USE LEWIS THERMOCOUPLES AND LEWIS RIMS WITH THESE INDICATORS

**THE LEWIS ENGINEERING CO.**  
NAUGATUCK, CONNECTICUT

Manufacturers of Complete Temperature Measuring Systems for Aircraft



#### New Transit Saves On B-52 Tooling

Development of an optical transit square and a specially designed tooling bar for use in erecting B-52 Strategic Bombers major assembly jigs are expected to save Boeing Airplane Co., Wichita, nearly a quarter-million dollars.

The new technique offers four-point accuracy:

- Accurate basic reference lines can be established in less time.
- Set-up time is reduced.
- Multiple crew toolings are possible.
- Need for many master tools is reduced and simplification of gages is possible.

Optical transit square was developed by Boeing and designed by the company pooled its information with that compiled by Ford Motor Co.'s Kansas City (Mo.) aircraft plant, using about six months in getting the system into operation. Made by Bausch & Lomb Instrument Co., Kansas City, it is said to be equivalent of the conventional 90° transit square.

The new transit square has a hollow box, one end of which is machined to a flat surface and the other by a partially machined window that can be seen through or used for purposes of selection.

Then up to four tools can be used on a single tooling bar, allowing four tools to work at once. The tooling bar has close tolerance holes drilled every 10 in. along the working surface, permitting a mobile carriage to be quickly mounted for holding the transit square along the tooling bar.

In addition to the eight-jet B-52 which is also being built at Seattle Boeing's Wichita plant, plus the forthcoming B-47 Stratojet bombers and B-47E photo-reconnaissance aircraft for USAF



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The part of Bendix in the technical progress of aviation is not just visual. Because Bendix has always understood aviation's next advance, every plane that flies, in some way, relies on Bendix Creative Engineering.

Bendix window actuators provide the visual aids for flight safety. Bendix then paved the way for engines equipped with Bendix starters, governors, limiter and fuel systems. Bendix automatic pilots, instruments, radio, acoustics, mechanisms, and other sensitive devices surround planes with safety and guide them to port.

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When you see the name "Bendix Avionics Corporation," on any product, you can buy that product with complete assurance that it is the final word in creative engineering and the last word in quality.

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# FLY WEATHER-WISE

These weather items prepared in consultation with the United States Weather Bureau

## FRONTS..

These boundary edges of air masses produce much of the weather affecting flight.

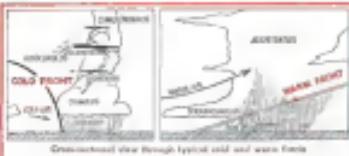
**FRONTS** may extend for hundreds of miles and cannot be avoided by local course changes, nor can they be topped at altitudes where they cause problems. By understanding the principal features of fronts, however, it is possible to recognize them and make adjustments to the flight plan accordingly.

Based on the frontal characteristics:

**COLD FRONT**—the advancing edge of a cold air mass. Showers typical of cold fronts; thunderstorms—Cumulus type clouds—Sudden wind shift after the front, usually to W, NW or N—Drop in temperature after wind shift. Glazing winter accumulates close.

**WARM FRONT**—terminating edge of a cold air mass caused by warmer, usually precipitation-bearing, air overtaking cold air. Front—Gradual wind shift to S, SW or W—Rise in temperature and humidity—Temporary clearing.

**OCCLUDED FRONT**—The upper front resulting from collapse of cold front and warm front line recognized on weather chart but when events indicate a mixture of cold front and warm front characteristics, it is likely an occlusion has taken place.



Cross-sectional view through typical cold and warm fronts

### Best Pair to Get You There!

The more you know about the weather, the greater your chance of profiting in performance. The more it is of the products that power and protect your engine.

Pilots who use Mobilgas Aero and Mobiloil Aero know they exceed rigorous Army and Navy specifications... often they've been first choice of air pioneers—Lindbergh, Earhart, Byrd and many others. It's safe to predict that with these products in your plane your engine will run smoother... perform better than ever. Fly safely... Fly with the Flying Red Horse!



MOBILGAS AERO, MOBIL, and MOBIL AERO  
MOBILGAS CORPORATION, GENERAL PETROLEUM CORP.

# AVIONICS

## New Lightplane Tacan Weighs Under 25 Lb., Costs \$2,000

A new receiver has appeared in the Tacan vs DME controversy, with the manufacturer by ITT's Federal Telecommunications Laboratory of a new, simplified, personal plane. Tacan weighs 1,000 lb. Min. D. 15, 1961.

C. Sandotto, technical director of ITT, says the new set will compete in new low cost receivers of simplified and housing a singleplane pilot receiver power source. Cost will be \$2,000.

Starting accuracy will be equivalent to current VOR private plane equipment. Sandotto says distance accuracy will be about one-half mile or 15%, whichever is greater. ITT officials say with this type distance accuracy, one will be built into the privateplane sets. The range equipment will be flight-tested in July, with production scheduled for October.

The set will contain fewer than 40 tubes, weigh about 25 lb., and measure 6x12x14 in.

One big advantage of the private

plane Tacan, as Sandotto says it, is the substantial reduction in vacuum tubes and elimination of all but a single antenna on the outside of the plane. Cutting the number of tubes greatly increases the set's reliability, Sandotto says.

He claims this compares to present up to the number of components in tubes and number of tubes used.

• **Conventional motion equipment** VOR, DME, beacon, marker, VOR/LOC and glide paths, and one 151 tubes, the number of tubes used in 87% with 250 tubes, 65%. Even if "multifunction" tubes are used, tube rate with 250 tubes drops only to 40%.

Many advantages of the single antenna are reduction in weight and drag and simplified installation. The antenna on a 10-ft. antenna, with 150 tubes, the failure rate is estimated as 87% with 250 tubes, 65%. Even if "multifunction" tubes are used, failure rate with 250 tubes drops only to 40%.

More advantages of the single antenna are reduction in weight and drag and simplified installation. The antenna on a 10-ft. antenna, with 150 tubes, the failure rate is estimated as 87% with 250 tubes, 65%. Even if "multifunction" tubes are used, failure rate with 250 tubes drops only to 40%.

of them a single, Sandotto says, that would about the probability of sending traffic failure down to 8%.

Sandotto quotes these additional figures to show importance of having number of tubes in a receiver based on a 10-ft. antenna, with 150 tubes, the failure rate is estimated as 87% with 250 tubes, 65%. Even if "multifunction" tubes are used, failure rate with 250 tubes drops only to 40%.

Many advantages of the single antenna are reduction in weight and drag and simplified installation. The antenna on a 10-ft. antenna, with 150 tubes, the failure rate is estimated as 87% with 250 tubes, 65%. Even if "multifunction" tubes are used, failure rate with 250 tubes drops only to 40%.

—Lucas was back around Radio Tech-

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a time for reflection



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FARMINGDALE, NEW YORK, N. Y. 11735

"where the future is measured in lighter years"



PRIVATE-PLANE TACH would combine distance and bearing data in a single package

and Conversion for Atmospheres SC-31, and met the requirements of the specification with hardly any modifications, says Smits.

The purpose of the special connector was to set up a survival program for the navigation and communications module for all aircraft using ATC facilities. Tachos (TAC) file the bill. Now is the time to convert existing ground DME equipment to Tachos before the equipment goes into gear, Smits adds.

Comparatively recently, use of the Civil Aviation Administration's ground DME equipment has been modified to give service to civilian Tachos equipment. The cost involved in such a conversion (on a headboard basis) was only \$200. A conversion inside the field would be less than \$3,000.

"Then, the entire program (VOR/DME) could be converted back to the original SC-31 plan at a cost of \$2,000 per CAA vertex in addition to swapping the low cost and more accurate DME equipment," says the engineer.

"The conversion can be converted back to the SC-31 plan by modifying the CAA ground DME and replacing groundstation representations with a liberal dose of goodwill."

#### Over 100 U. S. Planes Getting Sperry A-12s

Four major U. S. aircraft now are planning to install more than 100 Sperry gyroscopes with various types of lighting options.

At the head of this list of Sperry customers is United Air Lines, which will install A-12s (cockpits in 47 DC-7s, DC-6Bs and DC-6As). American Airlines will place the units in 27 DC-7s. Pan American World Airways will install the equipment in its new fleet of 21 DC-7s and Western Air Lines will put A-12s in the five DC-6Bs it has on order.

The Pan Am planes will also get the new Sperry Z-4 Zero Reader.

Internationally, British Airline Airways will equip its 18 Concorde 300s with A-12s having automatic approach couplers plus Sperry gyro barometers and Gyrotron compasses.

# HIGH PERFORMANCE PRESSURE SWITCHES

These recently developed aircraft pressure switches cover operating points within the entire range of inches of water through 3000 psi. Construction materials are compatible with operating media encountered in current and foreseeable aircraft applications. Design features permit all switches to meet or to exceed the requirements of MIL-R-32328 and other applicable performance specifications. The three illustrated here are widely adaptable for specific applications—demonstrating the high performance standards of our complete line.

Our long experience and extensive facilities for developing, manufacturing and testing pressure switches for modern aircraft can be helpful to you. Engineering counsel is at your service. Please direct your inquiry to our headquarters plant, Duxbury, Connecticut.



Differential Pressure Switch, Type 6840

Differential Adjustment Range: 20 to 30 inches of water. WEIGHT: 1.1 oz. 1.1 in. dia. 1.75 in. high. DIFFERENTIAL: 0.001 in. to 0.005 in. 0.001 in. to 0.005 in. 0.005 in. to 0.010 in. 0.010 in. to 0.015 in. 0.015 in. to 0.020 in. 0.020 in. to 0.025 in. 0.025 in. to 0.030 in. 0.030 in. to 0.035 in. 0.035 in. to 0.040 in. 0.040 in. to 0.045 in. 0.045 in. to 0.050 in. 0.050 in. to 0.055 in. 0.055 in. to 0.060 in. 0.060 in. to 0.065 in. 0.065 in. to 0.070 in. 0.070 in. to 0.075 in. 0.075 in. to 0.080 in. 0.080 in. to 0.085 in. 0.085 in. to 0.090 in. 0.090 in. to 0.095 in. 0.095 in. to 0.100 in. 0.100 in. to 0.105 in. 0.105 in. to 0.110 in. 0.110 in. to 0.115 in. 0.115 in. to 0.120 in. 0.120 in. to 0.125 in. 0.125 in. to 0.130 in. 0.130 in. to 0.135 in. 0.135 in. to 0.140 in. 0.140 in. to 0.145 in. 0.145 in. to 0.150 in. 0.150 in. to 0.155 in. 0.155 in. to 0.160 in. 0.160 in. to 0.165 in. 0.165 in. to 0.170 in. 0.170 in. to 0.175 in. 0.175 in. to 0.180 in. 0.180 in. to 0.185 in. 0.185 in. to 0.190 in. 0.190 in. to 0.195 in. 0.195 in. to 0.200 in. 0.200 in. to 0.205 in. 0.205 in. to 0.210 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## EQUIPMENT

# New Foam System Guards Eglin Hangar

A new type of hangar fire protection system which combines water deluge capability with Arfum, has been installed and successfully tested in USAF's Air Proving Ground Command, Eglin AFB, Fla.

The hangar is 100 ft. wide, 100 ft. long and 100 ft. high. Height ranges from 30 to 104 ft., at the top of the trusses.

The building poses a big fire protection problem, because it could house two B-58s or similar size aircraft, with more than 30,000 gal of gasoline in their fuel tanks.

The quantity would be sufficient to float the entire floor area with a pool of fuel half an inch thick.

### How it Works

Special problem in protecting this hangar and aircraft, contrasted with conventional buildings, is that the contents of the hangar can be more important than the value of the building itself.

The foam-water deluging system is triggered into action when temperature rises in the building, indicating the start of a fire. The system has two water-deluge valves. At water flows into the sprayer system it trips a quick-acting valve, which positions it to the foam liquid line.

Water and foam liquid are stored at the sprayer tanks. The combined solution passes through fire-shock glass to a rotating motor. As the solution is discharged through sprayer orifices, air is being entrained to produce a foam liquid.

Nozzles project past the outer-based foam water through 12 segments of flexible nozzles which make up the spray fan for approximately 30 ft. across. The system has 1,252 nozzles built to fit the entire hangar with the exterior building apart. The Arfum blanket fast floors over the hangar's steel superstructure, then drops to the floor in four reseparating blanket sections.

Arfum discharge may be initiated manually. The system may also be operated automatically as a standard deluge sprayer system discharging water only, or foam only, or dil charged.

Equipment used includes three 4,000-gal fire pumps which draw water from a 500,000-gal water reservoir, a 10,000-gal foam liquid storage tank, supplying a 200-gpm centrifugal pump, 16 10,000-gal storage tank storage tanks.



**CARPET OF FOAM** covers floor at Air Proving Ground Command special hangar at Eglin after test of new protection system.

### Aircraft Benefits

Arfum Sprinkler Corp. of Akron, Ohio, manufacturer of the system, says these benefits:

- Arfum can flow along the floor and then extinguish fire under aircraft wings and firelegs.
- Arfum will extinguish the surface flame of gasoline pool burning on a hangar floor and allow non-burning fuel to flow under the Arfum blanket to drain.

Chicago, following use of farm equipment. The system is set to discharge water only, dousing the protective foam blanket down the floor drain.

## Bearings Face Tough Jet Tests

Ball bearing rotational speeds up to 10,000 rpm and temperatures from 500° to 1,500° F. are the test range for the 170 to 150 mm. heat sinks, representing conditions at least three times as severe as those experienced by conventional bearings.

In combination with very high loading conditions, this means that maximum initial bearing contact in the required test will be 100,000 rpm, and the required bearing life will be 100 hours.

To give the main shaft bearings the greatest possible exposure, split water cooling ducts are used. Higher thrust shoulder bolts of the largest possible diameter and one piece machined cage all contribute to high bearing stability and longevity.

If these thrust loads exceed the design capacity of such a bearing, two separate matched units can be used to reduce the load per bearing.

Although auxiliary gear drive bearing operate at temperature and speeds only slightly above those found in

have to be made of tool steel, Muntz metal.

Jet engine bearing applications are usually main shaft bearings which support the compressor and turbine assemblies and sometimes gear drive input shaft bearings.

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## ... from field-testing harvesters to checking jet starter performance ... SANBORN OSCILLOGRAPHIC RECORDING SYSTEMS prove their versatility

### FOR INTERNATIONAL HARVESTER'S ENGINEERING TEST AND DEVELOPMENT DEPT.

A specially housed and closely mounted Sanborn 2-channel recorder provides dynamic strain measurements over a wide range for harvesting machines, during actual field use. In the photograph, after shaft torque and RPM are being recorded, one of several test International Harvester tractors has passed by the Sanborn system in field testing that harvesting equipment.

### AT AGRICULTURE WORKS, GENEVA, MASS. ...

A series of tests, regardless of various types of gasoline grades is conducted on a single-cylinder Beddoes Model 400 engine, used in conjunction with a special gas-shaking instrument, similar to the one shown. The engine's power output and torque characteristics are measured to a high degree of repeatability and precision in a minimum amount of time often required by customers.

### AT G. E. AIRCRAFT GAS TURBINE DIV. ...

Beddoes' performance data units are reciprocating, positive, RPM and starting rates of jet engine starters, using a modified Testines Model 47 system. The elements of information are reduced to this free-standing unit, equipped with three DC amplifiers, one telephone, a four-channel AC converter, two-channel servo, supporting hardware and two modified electric pulse amplifiers. The data unit provides G. E. engineers with an indication of the performance of all production units.

Research and Development



### RESEARCH AND PRODUCTION TEST



Production Testing



Research and Production Testing



RESEARCH AND TECHNICAL DATA AVAILABLE ON REQUEST

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## IN AVIATION THERE'S NO INSTRUMENT PROBLEM TOO GREAT FOR ROLLER-SMITH

**ROLER-SMITH**  
Ranges: 15-30 volts—6-100, 0-100, 0-450 ohms  
This meter is produced exclusively by  
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Aviation today relies on Roller-Smith to supply high quality precision aircraft instruments. Drawing on a background of nearly fifty years of engineering and manufacturing experience, Roller-Smith instrument makers are able to offer a complete line of instruments, designed to meet exacting specifications. If you have a specific problem in instrument research or development, take advantage of Roller-Smith's years of experience and know-how... consult our engineering staff for the answer.

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**AIRCRAFT LOAD METER**  
Ranges: 20 AMP, Amperes scale in DC, AC.  
Used in conjunction with external shunt in  
Measures load on DC aircraft systems

**AIRCRAFT VOLTMETER**  
Ranges: 120 VAC  
Insulated in 400 cycle, 330-1000  
cycles, 850-1400 cycle frequencies.



average applications, the high-stability requirement is not as necessary as in ARECIC 5 instruments and in some aircraft, load rating ranges of high-strength materials, according to Hascall.

Navy Department is engaged in an intensive research program to develop bearing capsules of strong solids so service in the high-speed engines may be prolonged.



### Panel Checks Cameras

High degree of skill is not needed to operate new test equipment that quickly inspects manufacturing parts and controls of small controls.

Cameras are plugged into the test board and the operator does three measurements—a test for each control modelled as a telephone-type dial. The actuator assembly is in the pot so that standard results follow from tests carried out by the operator.

Golden Electronics, N. Hollywood, Calif.



### Tape Collar for Props

New fast-eliminating tape collar for Blawill Standard variable-pitch propeller blade shanks is said to prevent erosion and prevent moisture, freezing-out surface for a rubber seal to ride on. It is also claimed to eliminate oil leaking and lengthens life of the seal. The tape, called Flexoseal 491, consists of a Poly Teflon bonded to an aromatic fuel and coated with a heat-resistant adhesive. Miller, John Mfg. Co., North Haven, Conn., says ROLAC has selected the tape as quantity, and says other aircraft are considering severe tests.

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the optimum in lighting uniformly, appearance, ruggedness, and simplicity.

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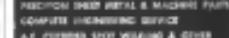
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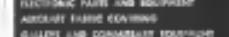
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fans produced by SKYLINE



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ing event. This step like the one at 24 deg. automatically becomes active when the summit is in the ground and very low prop pitch angles are required.

Automatic prop centering takes place automatically at the onset of engine or prop control failure during high engine power output. Systems are controlled by the engine temperature, which initiates the centering function at a preselected "no torque" condition. As soon as the engine produces torque again, action returns the propeller to normal operation.

Props may be feathered manually or independently of the automatic centering action. To do this, the fuel cockpit lever is twisted off, mechanically setting the prop control unit in the full feather position. Then the feathering button is pressed to start an independent electric feathering motor and prop.

Electric resistance heating elements are buried in the blade leading edges to reduce a clean installation which will not interfere with aerodynamics. Efficiency of the propellers is increased by heating elements attached to the inside of the spinner shell. Power requirements for the smaller (2.1 kva) and spinner (2.7 kva) heating elements are supplied by a 208-v. 3-phase, 400 cycle alternator. Each set of propeller and spinner is

then cycled alternately with or independently of the engine.

Prop blades emerge from the spinner with an aerofoil instead of a round section, resulting in improved aerodynamic efficiency. Light, stainless steel ribs cover the blade leading edges to reduce erosion and corrosion.

**Maintenance**

Props can be inserted or removed from the engine shaft without detaching the pitch change mechanism. Conversely, the pitch change assembly can be inserted or removed at a complete overhauled.

Blades can be removed without detaching the pitch change mechanism, which simplifies transporting the propeller.

A propeller change can be accomplished in 20 minutes.

Overhaul periods are propeller and assembly gear box 1,250 hr. feathering power—1,200 hr. Rotor control unit—1,150 hr.



**Missile Servo Motor**

Bole-torsa model 2N 1397, designed for guided missiles and other servo applications, is recommended for 100 hr. operation at 1,150 and 1,000 hr. at 75°C. Unit is used to respond instantly to revolution at -65°C.

Thermal performance is 12,000 rad/sec/sec and stopping time 0.02 sec with no external inertia loading. Unit measures 0.938 in. dia. x 1.5 in. long and weighs 2.58 lb. No-load speed is 7,000 rpm, shaft torque 0.30 in. lb. and total rotor inertia 1.8 gram-sec. Input power is three watts per phase and power current with motor supplied at 175 v. Servo motor specification is 26 v., 400-cycle, two-phase and brake resistance is 175 v. dc.

Antique Division, John Oster Manufacturing Co., 1 Main St., Racine, Wis.

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## Navigation and Control Devices PRODUCED for Missiles and Aircraft

Kollsman has designed, developed and produced the following navigation and control systems and components:

### FOR NAVIGATION OR GUIDANCE

**Photoelectric Sensors** for remote semi-automatic celestial navigation. Flight tests in jet aircraft give an overall geographical position accuracy of two miles.

**CLASSIFIED** *Instrument Ratecompensators* for precise attitude and orbital direction reference and navigation.

**Photoelectric Tracking Systems** for many years Kollsman has specialized in high precision tracking systems.

**Periscope Sensors** for normal orbital observation.

**CLASSIFIED** *Computing Systems* to provide precise data for automatic navigation and guidance, operated by optical, electro-mechanical, and pressure sensing components.



Photoelectric  
Sensor

### SPECIAL TEST EQUIPMENT

Test and decommutator for flight test observations.

Please note to engineering gear specific requirements in the field of missile or aircraft control and guidance.

**Television Ballistics** are available on most of the devices mentioned.

### FOR CONTROL PRESSURE COMPENSATORS AND IN PRODUCTION

#### Pressure Sensors and Synchronous Transmitters

**Isolators and Shuntless Sensors**  
• flat shaped • isolated  
• compact • shuntless pressure  
• low absolute pressure • 40  
• barometric pressure • low differential  
• pressure • shuntless  
• Mach number • decoupled  
• and Mach number

**Pressure Sensors** — to provide accurate signals for attitude, velocity and differential pressure, several specific.

**Acceleration Sensors** — for many applications are used by game.

**Pressure Switches** — caused by static pressure, differential pressure, rate of change of static pressure, rate of change of decoupling, etc.

**Meters** — measure special pressure, including new designs with integral gear heads.

## New Testing and Measuring Devices

These new electronic devices for testing and measuring have recently been announced by Galileo Mfg. Co. Details and applications of the new products:

• **Galileo P490** dynamic pressure transducer is designed for general lab work to measure airspeed, heat, transonic pressure variations. The maker recommends its use with its Galileo cathode followers Models P490, P495A and P497A. Cylindrical transducer has a maximum sensitivity over 90,000 psi, an absolute at one end and a transonic cathode follower at the other and has employed a highly sensitive piezoelectric ceramic transducer.

Open circuit accuracy is said to be  $\pm 100$  m.v./psi, natural frequency 155 Hz, passband range 0.000 to 900 psi, frequency range 25-20,000 cps, and transducer range -480 to 900.

• **Galileo ultrasonic probes** are available in two models. LU 100 with frequency response from 100 Hz to 2 Mc, LU 101 responding from 300 Hz to 3 Mc. In the 100 Hz to 300 Hz range the instruments accurately measure ultrasonic velocities, beyond 300 Hz they may be used as detectors.

• **Galileo piezoelectric high-frequency**

vibrator AT-484 isolates vibrational

resonance of dynamic tubes and

avoids transients in electronic acceleration and deceleration measure-

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## Vickers Organizes U.S. Firm To Handle Executive Viscous

Vickers Armstrongs, Ltd., has formed an unincorporated branch office in the U.S. corporation plane market and now has orders for more than a half dozen executive versions of its turboprop-powered Viscous 700D.

U.S. Steel Corp. was the first to announce that it is getting Viscous, with three scheduled for delivery next year (AW May 10, p. 93).

Vickers Armstrongs' spokesman in the U.S. says that Viscous is soon to receive equivalent additional contracts, but spokesman says that none will be announced soon. One of these is an executive single engine, probably two engines, Aviocar. When it is told.

In preparation for what it calls "unaudited internal" from the corporate auditor for its Executive Viscous, the corporate holder has formed a new company in the U.S., Vickers-Armstrongs, Inc., which will provide triple-used after-sales service and sell spare parts on the U.S. 8. The new company is capitalized at \$100,000, comprising 100,000 shares of common stock, all of it held by the parent firm.

Vickers-Armstrongs' warehouse in Alexandria, Va., established to handle Viscous parts for Capital Airlines, will fill under guarantee of the new company. Further plans include establishing of sub-dealers in the U.S. when there are several dozen to establish of Viscous operations. Indications are that Viscous will maintain a close grip on spares and does not plan to appoint distributors.

The new U.S. company's board includes T. Roy Jones, president of Drydane, Inc.; John L. Stedler, board chairman and president of U.S. Industries, Inc.; George F. Edwards, managing director, aircraft, Vickers Armstrongs, Ltd.; Ronald F. H. Yager, a VA director, and Christopher Curzon, the avionics head's U.S. representative since 1972. Vickers Armstrongs, Inc., will maintain technical offices at 1523 L St., N. W., Washington, D. C.

Richard Bettner has been appointed as the organization's chief technical representative.

Clarkson has been issuing the U.S. show potential customers brochures detailing the Executive Viscous's features. Prospects are offered a "bus bar" consisting of a standard Capital Airlines' cockpit with Bendix interphone and Collins radio, long range "slipper" tanks in the leading edge of the wings and auxiliary fuel tanks in the belly in the presence of most of the freight. Basic gross weight of this configuration is approximately 900,000 lb., plus 15% for payload. However, maximum can specify any cockpit layout or other equipment, with price then varying depending on that choice.

Planes can be delivered in 26 months, deliveries are planned now. Viscous spokesman says, "The bus bar will be flown to the U.S. for installation of avionics by American conversion specialists to the customer's specs." That procedure uses the buyer's 15% support duties on that phase of the airplane.

Admission of leading edge and belly tanks will give the Executive Viscous an ultimate stall air range in standard configuration of 7,000 ft. static, which allows climb to cruise at 25,000 ft. This is with 400 miles greater than maximum range. Viscous 700D without belly tanks.

The plane's main wing tanks will hold 2,200 U. S. gal., slinger tanks 345 gal., and belly tanks 500 gal. At that fuel load, gross takeoff weight will be 63,000 lb., with disposable load 33,400 lb.

Powerplants are Rolls-Royce Dart Mk. 510 rated at 1,550 shaft shaft horsepower each, plus 300 lb. of residual thrust.

The company points out that the turbine is capable of taking later, more powerful versions of the Dart with only minor modifications. Cruise speed with Mk. 510s will be approximately 320 mph.

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MICRO SWITCH provides a complete line of extremely reliable switches for aircraft applications. Hermetically sealed switches, hermetically sealed switches with side mounting, and many other switches withstand extremes and maintain switch reliability in a wide variety of class, chemical, weight, vibration and electrical characteristics. For all types of electrical controls.

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A PRINCIPLE OF GOOD DESIGN



These environment-proof precision switches are solving many exacting aircraft design problems

\* MICRO SWITCH not only offers the most complete line of precision dependable switches for aircraft applications, but gives a wide choice of hermetically sealed and environment-proof switches.

These MICRO SWITCH units vary in size, location, mounting and other characteristics to provide aircraft designers with just the right switch for critical requirements.

Shown on this page are just a few of the precision switches developed by MICRO SWITCH engineers to meet specific aircraft design requirements. Whatever your switch needs, it will pay you to consult with MICRO SWITCH engineers. For two decades the name "MICRO SWITCH, Precision, Illinois" has been recognized as the stamp of precision switch quality.

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# Valve Talk

for WM. R. WHITTEAKER CO., Ltd.  
by Marvin Allis,  
Senior Member, Aviation Writers Assn.



Some years ago a tanned young man in Leslie, cowboy boots and an open shirt appeared at the Whittemore Company's reception holding a blackened, gummy valve in his hands.

"This here's one of yours," he told the salesmen that started red-lettered correspondence. "It won't work any more and I want it fixed."

The girl called a field engineer who took one look at the inch-and-a-quarter gate valve and asked incredulously:

"What on earth have you been running through it?"

"I don't know—most everything, I guess," the young man answered amiably. "You see, I'm a sleep dealer... work on my own... and I use this here valve between the tanks and the spray nozzle to blow out the 'goop' off real fast when I need to."

"Get the valve from a spray gun, but the darned thing only lasted about fifteen hours before the quit cold. Figure you can fix her up for me? Get a lot of sprayin' to do and the fields won't wait long."

The engineer dredged Whittemore's "problem" file.

Company engineers immediately appreciated the importance of agricultural valves. And they deserved, too, the growth of interest and concern expressed in a series of letters from the industry.

The situation of the first engineer, in particular, was particularly pitiful, offered to Whittemore for repair was appealing. Cleaned up and disassembled, it proved to be in such bad condition that it had to be sent back to the manufacturer for a thorough inspection and repair. Those initials had clung to the valve, however, advertising to the customer the importance of careful operation of the unit.

The valve was rebuilt without loss of time but was repaired as rapidly as possible to get it back to the customer. The man who had sent the valve back to his place was his spray gun dealer.

Work of Whittemore's correspondence group, however, did not stop with this particular customer. Working with valve troubles wrought by a wide variety of uses for which the units were not intended.

In one instance, it was discovered that valves of large size had reacted to temperatures up to the fire of 100° F. compound and certain certain temperatures up to the 100° F. point where the valve would not turn out the nozzle. These units were sub-scribed and were found to be ideal for this purpose.

In still another case, the valve was a factor in the repair job done for sun-

## AVIATION CALENDAR

June 9-16—Sixth All Women's International Air Race, Washington, D. C., to Hawaii, California.

June 15-19—Twenty-first International Air Fair, Dugny, Le Bourget Field, Paris, France.

June 15-17—Society of Automotive Engineers, Golden Anniversary meeting, Chateau Hotel, Hoboken, N.J., Atlantic City, N.J.

June 17-21—Aerospace Electronics Council, Fairmont Hotel, Boston, Boston, Mass., Calif.

June 18-20—Women's International Air Fair, Midway Derby, Little Rock, Ark., to Return, N.M.

June 19-24—Forum course on Boundary Layer Control, University of Wichita, Wichita, Kan.

June 18-25—American Society of Mechanical Engineers, 19th National Applied Mechanics Conference, including sessions on astronomical and guided missile research, Rensselaer Polytechnic Institute, Troy, N.Y.

June 19-24—Federation Astronautique Internationale, 10th Anniversary Conference, Paris.

June 19-25—Philadelphia Junior Chamber of Commerce, third annual Transcontinental Air Classic, Fair Spring, Calif., to Philadelphia.

June 29-July 1—American Rocket Society, annual meeting, Hotel Statler, Boston.

June 19-25—American Society of Mechanical Engineers, annual meeting, with five sessions, Detroit, Mich., Boston.

June 20-21—Meeting of the Aerospace Research Council, The Mayo Foundation, Inc., of Gustafson, Calif., International Aerospace Conference, Los Angeles, Los Angeles.

June 20-25—Symposium on Electromagnetic Wave Theory, University of Michigan, Ann Arbor, Mich.

June 20-21—Belgian Aircraft short course on Fundamentals of Materials in State of Technology, Charleroi.

June 22-24—Aviation Distributors & Manufacturers Assn., Silver Anniversary meeting, Derry Penn Lodge, Burnetts, Mich.

June 22-25—25th Annual Heat Transfer & Fluid Mechanics Institute, University of California, Los Angeles.

June 23-25—Meeting of Navigation, 11th annual meeting, Maxwell AFB, Montgomery, Ala.

June 27-July 3—American Society for Test Materials, 19th annual meeting, California Institute, N.Y., Atlantic City, N.J.

July 2-4—First Ass., second annual Earl T. Ross Memorial Trophy competition for Air National Guard jet pilot, Los Angeles to Detroit.

July 2-4—Second annual Western New York Air Show, Frontier Park, Dunkirk, N.Y.

July 2-4—International Aviation Exposition, Detroit.

July 2-16—Twenty-second National Scoring Contest, Hamm Hill Farms, N.Y.

July 12-14—Western Plant Maintenance and Engineering Show, produced by Gipp and Pollard, Fox Pavilion, Los Angeles, Calif.

# CANADAIR Sabre 6



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NEXT FUEL  
OR HYDRAULIC  
SYSTEM  
CRASH PROGRAM



## Where can a Parker Team help you?



When Lockheed Aircraft engineers called Parker, they wanted action. Lockheed had designed a new hydraulic system to give more positive control over the power operated selector valve used on the P2V-Nippies. As a result of the new design they had a requirement for a 6-port valve which was not available from any supplier.

In 18 days of intensive, day and night application and working so closely with Lockheed they were practically an extension of the Lockheed Engineering Staff. Parker team from the Hydraulic Division delivered the first units. In that short time they had designed the new valve with a new solenoid, made castings, and started production. The system was installed in an aircraft and found so satisfactory that it was subsequently installed in other P2V models as well as current production.

The new system employs two valves per plane. They are direct solenoid operated, non-interlock type, with a normal operating pressure of 2000 PSI. Internal leakage is less than 0.001 in. per second and the maximum pressure

drop is 100 PSI at 4 GPM at 19° F. Actuating time to energized position is 0.1 seconds maximum and to normal position is 0.5 seconds maximum. The solenoid is continuous duty type with a maximum current drain of 6 amperes.

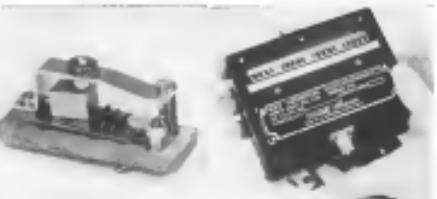
The Parker team method of intensive application is available to you for all problems involving aircraft fuel valves, hydraulic valves, check valves and related components. If you have a problem in one of these fields or are beginning system design, get a Parker team on your staff!

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## NEW AVIATION PRODUCTS



**SNAP-ACTION SPRING** unit (left) with adjustable pins fits into box containing controller.

### G-Counter Helps Predict Fatigue Failure

A vibration accelerometer, designed to help forecast aviation failure, has been manufactured by the Univen Division, W. L. Marston Corp. Development was carried out by Univen in cooperation with the National Bureau of Standards and under Bureau of Aircraft Accidents investigation.

If the number of times an aircraft structure is subjected to a known stress, the stress rates of G-measure can be accurately determined, the fatigue failure of the structure can be foretold, according to Marston's theory of cumulative damage. The vibration accelerometer tells the researcher how many times a particular G-level has been applied.

The instrument incorporates four-diode, electro-magnetic counters, which may be adjusted to register any desired G value from 1 to 10. Counts are activated by Univen micro-motion sensing elements which contain an adjust-

able mass mounted on a leaf spring. Scale is put on a digital display G value on a horizontal carriage.

Electrical accuracy of the accelerometer allows the user to record only significant G, and ignore small increases in amplitude. Each counter records the number of times the sensor is exposed to the G value which it is set to record. A balance counter registers permanent increments due to shock, vibration or acceleration.

The accelerometer requires no power, film or other operating supplies. It need not be shrouded while in use and it requires neither processing nor data reduction. The instrument was designed for low maintenance, high reliability and fast-field recording of all movements and g-forces.

It operates on 28 volt d.c. and counts down 200 milliseconds with 5% of the total count in 50 ms. weight is 2 lb. 7 oz.

### Pack Press for Wiring Boards

Printed wiring boards can be pressed at normal rates of 80-120 holes per minute using new BA-4P (barrel) pack press. Hole up to 11 mm diameter are punched.

In operation the press trips automatically when the hole location is depressed so that it is engaged in a template hole. Engaging a fast switch causes the solenoid solenoid rod to move. Thermistor-controlled heating element in the table maintains desired punch temperature in preferred location. Hole size, the rated value is

close down, for the handles also can be used for carrying the item. The smaller size, 500 pound maximum load, maximum horizontal working load is 400 lb. at 100% load at 600 lb.

Locking mechanism is designed to give a vibration proof seal when closed. Latch may accommodate a maximum panel size of 4 in. x 4 in.

Circus Partner Corp., 35 Springfield Valley Rd., Passaic, N. J.

### Liquid Sensor for Fuel Systems

Equalizing vent detects presence of liquid in 9/16 in. and absence of liquid in 5/8 in. and has applications in aircraft fuel systems. It can be used in aircraft as a high level cutoff switch when tanks are being filled. A sensor is being developed that will operate in freezing winter seas, the magnetic buoy reports.

Wiedemann Machine Co., 4272 Wiedemann Ave., Dept. 25, Philadelphia, Pa. 19104.

### Latch for Electronic Chassis

Electronic chassis panel latch 21L not only provides leverage to open or

close a panel, but also provides a small thermal and magnetic power control package and an indicator light which can be set to light. Multiple probe types are available for reporting extensive operation.

Unit is stated to be operable from -53° to +230°, has no moving parts and is not subject to wear, clogging, corrosion, vibration or shock.

Air Associates, Inc., Teterboro, N. J.

### Long Perlin Head-Treated

Spindle designed by Loftus Engineering Co. to extremely high-tensile carbon-steel parts. Vertical 752 features his been certified by U. S. Air Force for landing, taxying, take-off, wheel steering and nosewheel and tailwheel, steel and aluminum, the manufacturer reports.

Unit is strength oriented and meant to make runs up a 25-ft. deep and 60-ft. long jet housing, three aircraft-type punch holes curving 90°, 45° or 90° in. It has been found that the hot roll quench reduces distortion up to 90% compared with conventional quench, the maker states.

Face width is 15 in. and height is 15 in. Face working space is 9.5 ft. wide and 22 ft. high. A self-contained unit is in a single housing.

Melbogard, Inc., Minneapolis 14, Minn.



### Small Circuit Breakers

Minimum trip-free Khtron D6701 aircraft circuit breaker has high trip rate capacity and low handle over 2,000 amp., 120-140 cps a.c. and 6,000 amp., 10 v. d.c., the manufacturer states. Breaker is designed to meet operational requirements of MIL-C-5009.

Two of these units can fit into the same mounting space as one MS type breaker, it is reported. Breaker is switchable at ratings from 5 to 15 amp.

Spencer Thermal Division, Metals & Controls Corp., Attleboro, Mass.

### Aerolis Test Chamber

Temperature test chamber for electronic equipment has a range of -196° to 200°F and automatically cycles tem-





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Photo courtesy  
Mervin-Nelson Portable Air Heater, American Filter Co., Inc.

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Extensive fabrication facilities, plus Government Certified welding techniques, have enabled Lavelle to produce over 6,000 of these complex assemblies, each requiring 35 separate welds, minus heat exchanger tubes. To assure close tolerances and repeat production of the many component parts of the unit, special tools were designed and made at the Lavelle plant. Complete inspection includes pressure testing of each unit prior to shipment in Hermetically Sealed packages or complete. Lavelle has the capacity to fabricate the precision parts and assemblies you need... whenever you need them.

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## • SAFETY

before report and that all controls and instruments were functioning in a normal manner. The engine, a Pratt and Whitney R-1340, had been properly maintained.

At the time of the accident the flying operation of Petroleum Helicopters was based and maintained in the United States, Florida and Venezuela. In the Grand Isle area it was a transportation service for oil and oil well drilling companies. The operation was restricted to transporting personnel over short distances between Grand Isle and several offshore oil drilling locations. The accident, a completely unusual and unprecedented in the oil industry, was conducted to provide transportation as a regular and emergency basis, involving approximately 45 flights during a 25-hour period.

Petroleum disclosed that the company employment standards for helicopter pilots were high and that training and experience were mandatory. Required by the company was that pilots to make a safe operation. Company policy gave the pilot authority to discontinue or cancel a flight if conditions, in his opinion, made the flight unsafe. The maximum weather conditions for takeoff were limited to ceiling 100 feet and visibility 1/2 mile.

Other safety procedures and requirements provided that the seating configuration was that passengers were equipped with and wear life jackets and that the passengers took seats commensurate with the last landing pattern. The cockpit also provided oxygen tanks and oxygen masks so that all seats were forward facing before the flight. According to testimony these requirements had been set before the subject flight.

Refining procedures used in the crew's operations required that the helicopter be lowered with sufficient fuel for the next scheduled round trip flight, which was to be a distance of 30 to 40 miles round. Petroleum advised that the aircraft was to be fueled prior to the subject flight, also, for damage to the wreckage indicated that a considerable amount of gasoline had all leaked following impact.

Several witnesses substantiated the crew's statement that prior to the time of impact they could see shore lights and other off shore drilling or lights which could be perceived 10 to 15 miles away. There were steady winds. Witnesses indicated that at least four birds were torn to pieces soon after the flight departed.

Both crew members of the subject flight were well qualified and had received flight checks on company operations and many emergency procedures for helicopters. Both also were dual pilots and during daylight hours flew alone. At night, however, as a safety measure, two pilots were required to operate the BT-50 and the pilot tested the flight instruments' function prior to each flight. Communication equipment installed in the aircraft at the Grand Isle base and at each offshore location provided continuous contact between the aircraft and any terminal or air force radio frequency. Operating procedures gave aircraft transmission priority over all other messages.

At the present time helicopter flight

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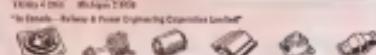
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**Simple-to-operate G-E thrust augmentation system gives 6000 lbs of added thrust to Stratojet**

Strategic Air Command Boeing B-47's now have considerable extra take-off power because of a water-alcohol injection system developed by General Electric for the Company's J47 GE-25 turbines.

This new system permits take-off at heavier gross weights and/or shorter take-off distance for the stand-and-airplane (see diagram above). It helps in increasing the B-47's gross-load take-off capacity.

Operation is simple. The pilot throws a single switch in the cockpit at the beginning of his run. A mixture of water and alcohol flows into the combustion chambers of the engines. The mixture increases the mass flow through the engines, as well as the velocity of the jet

exhaust gases. The result is a one-engine B-47E is 6000 lbs of added thrust for faster, shorter take-offs.

### Continuing G-E Engine Improvement

Many other J47 improvements at General Electric have helped the Boeing B-47 maintain its position as the world's fastest operational bomber. For example, over 3000 design changes have been made in the J47 since 1948, contributing to improved performance, greater reliability, and longer life.

Continuing G-E component development and design studies are now paying off in even more powerful, more efficient engines for the future.

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**SIMPLICITY OF G-E W/A SYSTEM** is evident here. Small tubes around core nozzle were forced under-thrust inlet from B-47's GE-25 turbines.

**INCREASED B-47 POWER** is reflected in continuing G-E J47 improvements—today's J47's, for instance, deliver 14% more thrust than earlier models. GE has logged over 200,000 flying hours since 1948.

**PRODUCTION RECORD** of increasing aircraft size and weight and today's GE General Electric's advanced new Component Development Center at Cincinnati, OH.



**G-E WATER-ALCOHOL INJECTION SYSTEM**, used in place of costly "Axial Take-off" units, clearly cuts down take-off distance in addition to saving Air Force money on each take-off.

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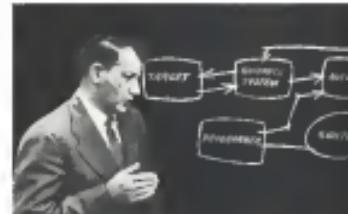
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other situation would result in chaos." CAB's proposal to leave the Civil Aviation Administrator's authority to civil aviation rules unchanged could effectively block any real expansion of civil-military status of an aircraft.

Tipton considered the proposal "boldly unanticipated and one which could completely reverse the policy, which both the government and the industry have been endeavoring for years to carry out." Vigorous efforts and enormous expenditures of time and money have been concentrated in a cost-cutting study's program. What the Defense Department now means to be proposing is that the analysis be abandoned, he said.

Ricks and Tipton also objected to their USAF proposal.

• **Fleet USAF contract comes to take high without regard to their own authority.** The USAF is to make emergency shift contracts without regard to its role with CAB.

• **Permit military personnel to repair civil aircraft without signed for Civil Air Regulations.**

## Direct Eric-Detroit Route Under Study

Civil Aviation Board will investigate the need for direct local service between Fort, Pa. and Detroit.

The Eric-Detroit Service Case is based on an application of the Eric Municipal Airport Authority for service between the two cities. Allegheny Airlines, Allegheny Airlines, Mohawk Airlines, Lake Central Airlines and North Central Airlines said that routes appear to be consolidated with the Eric-Detroit case.

CAB has included application of all four local service carriers but has not yet ruled on the application which didn't apply directly to the same case using the case study to Detroit-Eric service.

## DC-4 Deal Approved For Eastern, Slick

Eastern Air Lines and Slick Airlines have received exemption authority from the Civil Aviation Board to lease DC-4 aircraft from Air Lease, Inc.

Eastern was incorporated two months ago and bought three DC-4s from Eastern.

Eastern is leasing five of three back for a year, and Slick is leasing three for the same period.

Eastern is empowered under its lease agreement to buy, lease, charter or otherwise acquire aircraft, but it cannot build or operate them, nor can the company

engage in airline operations. Of 1,000 shares of stock authorized, 800 have been issued.

Of those, 100 shares are held by Standard Fortune Corp., 100 by Intercontinental Management Corp., and 25 by R. R. Hart, J. B. Lewis, James Englehardt and Stanley D. Wien.

In its order, CAB notes that Hart, Englehardt, Lewis and Wien are in control of both Aero Lanes and the North American Airlines group. The Board specifies that in addition to its use, exemption in Slick and Eastern shouldn't be construed as approval or endorsement of the relationship.

## Lights Test Extension Favored by Board

Continued expansion of night lights or instrument aircraft is favored by the Board of Safety Regulation of the Civil Aviation Board in a proposal to expand its special regulations on the subject.

CAB wants to extend the authority, as special Civil Air Regulation SR 362 in Part 30, 1960. The present regulation, which expires at the end of this month, was adopted April 9, 1951 to permit expansion with a limited series of aircraft on position light and anti-collision light systems.

The proposed regulation, which would replace the present one, would permit air carriers to experiment with lighting projects while operating in scheduled or other service. Approval of the Civil Aviation Administration would be necessary, and it would have the responsibility of prescribing conditions and limitations needed to insure safety and avoid confusion in air navigation.

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## Lufthansa Is Given

### CAB Carrier Permit

Operation of Lufthansa, the new German airline between Germany and the United States has been approved by Civil Aviation Board and Press Minister Baerbock.

CAB has issued a foreign air carrier permit to the carrier which authorizes transportation of persons, property and mail between a point or points in Germany and New York on Shorthorn and Condor.

The permit is good for a year or any further period provided for when a bilateral agreement is reached between the United States and the Federal Republic of Germany before that time.

The Civil Aviation Board has granted a lease of three aircraft to Lufthansa in Germany. The carrier will lease the aircraft to the German Air Force.

Eastern is empowered under its lease agreement to buy, lease, charter or otherwise acquire aircraft, but it cannot build or operate them, nor can the company

engage in airline operations. Of 1,000 shares of stock authorized, 800 have been issued.

Of those, 100 shares are held by Standard Fortune Corp., 100 by Intercontinental Management Corp., and 25 by R. R. Hart, J. B. Lewis, James Englehardt and Stanley D. Wien.

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Because of these conditions, the seat charge banks and the Federal Housing Administration will not grant or guarantee loans to buy or build homes in the outcome.

## SHORTLINES

• **Icelandic Airlines** originated weekly direct service between New York and Los Angeles. Fares for the all-business service are \$251.90 one way and \$307.10 round trip.

• **North American Airlines** started nonstop service between New York and Detroit with four flights a week.

• **North Central Airlines** carried 25,633 passengers in April, a 45% increase over April 1954. Load factor increased from 41% to 48%.

• **Swissair** reported first quarter air freight traffic increased 27% over the first three months of 1954.

• **Tamiami Air Lines** reported a 90% increase in West Coast Hawaii passenger loadings in first quarter 1955 over the same period of 1954.

• **Twa World Airlines** started nonstop service between New York and San Francisco June 1 with Super G Constellations on its New York-Shoreham and San Francisco routes.

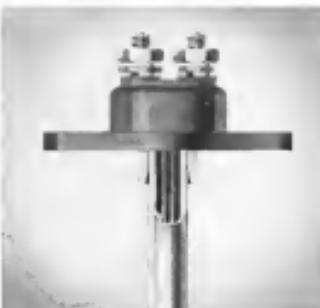
• **VARIG** airlines of Brazil plans to inaugurate direct New York-Caracas flights this summer with Super G Constellations on its New York-Shoreham route.

• **British Overseas Airways Corp.** plans to put the Vickers Viscount transports on its Manila-Nauru route this year.

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First crack out of the barrel, the production model F-5D broke the sound barrier in level flight. A top performer, the plane is a plenty fast at climbing, too.

A Pratt & Whitney Aircraft J-57 engine, in the 10,000-pound thrust class, lifts her from a carrier deck. An afterburner increases the power tremendously.

The Skyraider is now in production at the Douglas Aircraft Company. Like other jets, the speed batwinged plane has many parts made of Inco Nickel and Inco Nickel Alloys.

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## Customer Is King in West Coast Battle

By William J. Coughlin

Los Angeles-Champagne, Calif., or Chicago are paving the way for Western Air Lines in battle with United Air Lines for trans-Continental traffic on the Pacific Coast.

Western executives estimate that more than 20% of the carrier's traffic in 1958 will be to and from the so-called "Champagne Flight."

Seeking a new flight, Western has tried its super-de-lux flight the "California." The public, however, quickly brought the newest Champagne flight on the service.

This has caused no little discomfort to United Air Lines which have had to add onerous charges on some of its flights to meet the Western competition.

"Would you like to take out class passengers, flights to UAL, reservations etc. and a customer not long ago on the phone. I thought I was talking to United Air Lines," the customer replied. "Is this Western?"

Western feels that 90% of the passengers on its champagne flights accept the sparkling toast. This is a much higher percentage of drinkers than for regular flights.

Passenger safety is a factor, according to the airline, in the success of the champagne service. The customer is handled on the phone when he makes his reservation and even when he arrives at the airport.

Western offers its champagne flight passengers a seat selection option that enables them to sit where they prefer. Thus, it developed, has the added advantage of attracting travel-wear passengers to the airport earlier, thereby spreading out the arrival of passengers. Seats are not reserved, so the reduces the crowds at the gate.



FLYING HIGH—WAL, worn Pacific traffic



with champagne, UAL, battle on methods

UAL official explains. United also doesn't want any baronial—and their slogan is "any place should become a flight attraction."

"But there is more than champagne to it," Western tells its "California package."

There are flights for the guy who always wants the best in transportation—and it's a big market," says Arthur K. Kells, Western's vice president. "The birthday begins with the way the customer is handled on the phone when he makes his reservation and even when he arrives at the airport."

Western offers its champagne flight passengers a seat selection option that enables them to sit where they prefer. Thus, it developed, has the added advantage of attracting travel-wear passengers to the airport earlier, thereby spreading out the arrival of passengers. Seats are not reserved, so the reduces the crowds at the gate.

#### Just Like Home

Stewards are selected for the flights on the basis of personality and training. They are coached to serve the champagne "just as you would at home."

"You don't serve a guest as you have one drink and then larger ones," Kells points out. "The champagne glasses are large full."

Dinner on the "California" includes a \$6.50 flat option of the best grade available. It is served in a plasma tray of new and more convenient form and with crisp, clean linen. The flight attendant will help the passenger with napkins and ashtrays.

"We serve customers only to meet the competition," says one United official loosely.

United serves its drinks on rugged 4-oz. portions. This is in the hope that one drink will therefore satisfy the passenger. "We don't want our stewardesses becoming barmaids," a

line has excited a problem for itself. Customers complain that the air line service is much more inclined to complain when something goes wrong.

"It has become such a high standard of service that we must live up to the standard of maintaining it that way," says Kells. This means Western complete line is well handled. But Western officials in Los Angeles, San Francisco and Seattle told Aviation Week that the champagne flight has been a tremendous morale-booster for the airline's employees.

#### Side Benefits

The premium service has turned up a number of side benefits for the airline. The California Wine Council has assisted Western in boosting the flight, rating the airline for its production of California products. The airline serves only California Gourmet California, a range of private stock and a special wine.

The Cup Institute of America helped to help settle a dispute on which wine would be paired out and then joined in promotion of the flight.

The premium glassware is one of the first of French preferences, specially packaged for Western Air Lines. When male passengers ask for a meal for their wives or girl friends, they are asked to the stewardess for their business card, with the powers that the female will be called to them. This not only saves as a later reminder of a pleasant flight but also gives Western the chance to follow up with sales calls.

Western has an extensive public relations program for its flight flights, but the airline is bringing first-class air travel to the attention of the public with a promotional campaign and flight-service to match it—that is tops in appeal.

# Airwork Expands Cargo Service, Calls Britannia Next Freighter

By Gordon Caudley

Aerwick Atlantic is expanding its routes and increasing flight frequencies after three months operation of scheduled 8-flight service between the United States and Europe.

The air carrier also is looking beyond its present leased transports and new equipment in order to begin future freighter flights—the return of British Aerospace Co.'s Britannia.

## Solid Route Patterns

Britannia's invasion of the U.S. airfreight market started early this year after President Eisenhower and the Civil Aviation Board granted Airwork Ltd. a trans-Atlantic airfreight permit. The carrier then acquired both airline British airline and an Aerwick Atlantic in a wholly-owned subsidiary.

The new line inaugurated operations Mar. 1 with two weekly roundtrips over a 11 cities, from New York/Montreal, Geneva, Keflavik, Shannon, Glasgow, Manchester, London, Frankfurt, Zurich and Basel, Switzerland.

Last week Aerwick Atlantic extended its European route to Dusseldorf and began preparing for service to Milan when the British government completed negotiations with Italy for landing rights. Similar negotiations are under way for additional cities in Germany.

Route extension came after the airline increased scheduled flights to three roundtrips a week. "As soon as we get our feet on the ground, we added a third flight," said John F. Mould, president of Aerwick Atlantic. "This is a pretty cold route pattern, and we intended some changes."

## Next Airfreighter

The carrier now has North Atlantic freight on a Douglas DC-8 leased from Stik-Airways and the DC-8 from Transocean Air Lines. The U.S. air line also provides the carts (AWW Feb. 7, p. 94). British pilots will take over the DC-8 within the next few days.

In January 1956, Aerwick Atlantic will receive the first DC-8s of three on order and begin placing on the trans-Atlantic transports. But the airline probably will sign a new agreement with Stik and Transocean to handle additional freighters needed to keep up the trans-Atlantic.

Aerwick Atlantic's transports will be equipped with ten truck and galleys, offering quick conversion to passenger configurations for charter flights—the parent company's primary source of revenue.

Meanwhile, Aerwick Ltd. is negoti-

ating with British for an airfreight version of the Britannia but has not approached the builder for configuration. One major issue is the use of the proposed freighter's fuselage, with Aerwick arguing for larger cargo doors than British wants to build.

## Optimistic Outlook

This is the most favorable freighter for Aerwick Atlantic, said Mouldfield. "If and when British agrees to meet our specifications, Preliminary studies indicate the Britannia will longer our trans-Atlantic flights considerably."

The scheduled trans-Atlantic airfreight service now operates on a 4000-mile Aerwick Atlantic capacity to and from London. In the event of a strike, the carrier can use a fast factor of better than 40% with its present equipment.

Between Mar. 1 and May 23, the load factor averaged 41%. The first DC-8 to fly to a full 24,000-lb. payload took off from New York Mar. 14.

Total available cargo capacity during the first 12-month period is figured at approximately \$2 million to for 345 flights.

Company officials are optimistic about the chance of increasing cargo volume to a point where the investment will begin to pay off. But depending on airfreight forwarders, the line is achieving results in the form of shipments, shipping records, in the form of shipments

to regular cargo shippers. Aerwick Airways offices reserved space on its transports and moved thousand delivery.

Aerwick Ltd. looks up its subsidiary's global program with its charter fleet.

On one such operation, Stik packed

up a planeload of oil company ma-

chines and flew it to New York. Aerwick

Atlantic carried the cargo across

the Atlantic to London and Aerwick

Ltd. delivered the load to Tel Aviv.

"We did it a day faster than anyone

else could," said Mouldfield, "and

changed the regular DATA rates."

The freight line also can use the shipping offices and facilities of two members of the parent company—British, Witco & Co. and the Blue Star Line. The company is in the process of setting up a charter United States, Canada and Europe.

To supplement its normal volume,

Aerwick Atlantic is moving to increase

North Atlantic passenger service, which

can operate as an airline, and carry their

airline. Cargo agreements with the

larger carrier would make two units

the airfreight line could give passenger

service as cargo it could not make

within 24 hours.

"We don't compete with passenger

airlines," said Aerwick Atlantic's presi-

dent. "And we're in a position to

move passenger luggage or freight—

whatever you can fall back on during the peak summer tourist season. Of

course the guts of our business still

will be bulk cargo."

The carrier has a cooperative working

agreement with British Overseas

Airways Corp. In addition to exchange of cargo, the airfreight line temporarily

## Reserved Cargo Space

American Airlines is offering reserved airfreight space on five daily nonstop Douglas DC-7 flights between the East and West Coasts. Reservations will be made at the airline's gate.

"Under the reserved space program," said J. D. Bayley, director of cargo sales, "a shipment leaving New York or Washington in the morning will be assured arrival in Los Angeles that afternoon."

Reservations cannot apply only to those New York-Los Angeles flights, and the reservation service that operates twice a day between Washington and Los Angeles.

Since BOAC's freighter and newspaper at New York's Idlewild International Airport.

Permanent facilities will be built west of BOAC's in Idlewild's proposed \$60-million terminal city (AW Feb. 28, p. 87).

## Global Delivery

To regular cargo shippers, Aerwick Airways offices reserved space on its transports and moved thousand delivery.

Aerwick Ltd. looks up its subsidiary's global program with its charter fleet. On one such operation, Stik packed up a planeload of oil company machines and flew it to New York. Aerwick Atlantic carried the cargo across the Atlantic to London and Aerwick Ltd. delivered the load to Tel Aviv. "We did it a day faster than anyone else could," said Mouldfield, "and changed the regular DATA rates."

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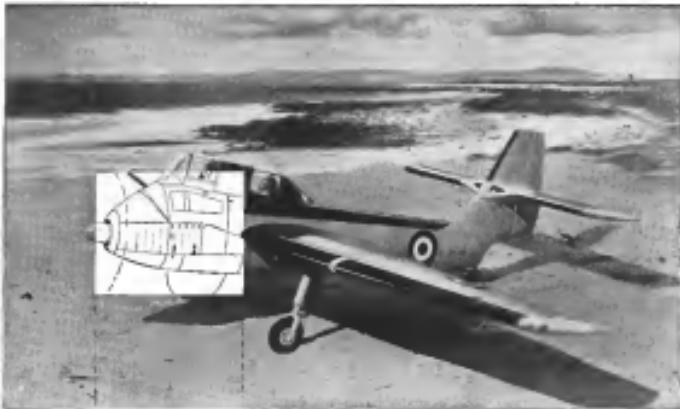
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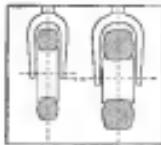
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## Reversal on Russian Airpower Threat

Domit in Congress, the Pentagon and the White House during the past two weeks have confirmed in even detail the facts published by AVIATION WEEK on May 25 regarding the number and type of new Russian aircraft deployed over Moscow: the significance of this rapid progress in Soviet jet airpower to the United States, and the charges made that top level civilian government officials were deliberately concealing the true facts on this Russian air threat from the American people.

Some publication of AVIATION WEEK's story, "Russia Jet Airpower Grows Fast on U.S.," and its editorial, "Double Shock for Americans," on May 25, the Eisenhower Administration has completely reversed its position on the scope and significance of the growing threat of Russian airpower to this country. From a confident attitude of "all's well" and "no changes are necessary," the administration has switched to public admissions that the Russian threat is real and that it requires prompt action in accelerating production of key U.S. aircraft such as the Boeing B-52 heavy jet bomber.

Here is the detailed chronology of this amazing reversal of position by the Administration:

**May 13**—Department of Defense releases vague and incomplete statement on Russian air display over Moscow.

**May 17**—Sen. Stuart Symington calls for a congressional investigation to determine whether Russian airpower is growing on the U.S.

**May 18**—President Eisenhower answers Sen. Symington's charges, stating "it is just not true" that we have lost technical and numerical superiority in the air "in a twinkling."

**May 19**—USAF Secretary Harold E. Talbott and General Nathan F. Twining, USAF Chief of Staff, announce House Armed Services Appropriations Subcommittee that the U.S. is superior to Russia in the air. Brig. Gen. Woodbury Berges, director of intelligence for Adm. Deane, Commandant, is rebuked by Gen. Twining for stating publicly in Detroit that "the Russians have planes that are as good if not better than the U.S."

**May 25**—AVIATION WEEK publishes full details of Russian air displays and charges top level civilian officials had concealed these facts from American people in an editorial. AVIATION WEEK's story and editorial which quoted in daily newspapers, radio and television. Senator Symington takes Senate floor to demand that Adminis-

tration either confirm or correct AVIATION WEEK statements.

**May 26**—Defense Secretary Charles E. Wilson confirms AVIATION WEEK's details on numbers and types of Russian aircraft down over Moscow as an official Defense Department statement. Secretary Wilson tells his press conference there are no plans to change the aircraft production program.

**May 27**—Secretary Talbott and Twining testify in executive session before the Manned Applications Subcommittee of the Joint Congressional Committee on Atomic Energy. Testimony reveals earlier statements and admits Russian airpower threat is grave and U.S. action required. Senator Herrick Jackson, subcommittee chairman, says proof that Russian threat is genuine will come when USAF announces a more accurate production of B-52 heavy jet bombers and other assault types.

**May 28**—Secretary Talbott and General Twining testify in executive session before the Senate Armed Services Committee. Immediately afterward, USAF announces a 35% acceleration of Boeing B-52 heavy jet bomber production.

**May 30**—President Eisenhower confirms that USAF has been authorized to accelerate B-52 production.

These events have indicated clearly that the top level civilian officials of the government concerned with national defense were wrong in their original attempt to conceal the true scope and significance of the Russian air display from the American people and were wrong in their evaluation of the recent rate of Soviet aerospace progress as related to the pace of U.S. development.

Thanks to the energy and enterprise of a free press and the persistence of key legislation in the Senate the record on the score has now been set straight.

But the acceleration of the B-52 production program is only the first step in a positive, concrete program necessary to provide and maintain a significant U.S. lead in the air over our Russian competitors.

The entire aerospace research, development and production program of both USAF and the Navy must be reviewed, reevaluated and revitalized to sustain the rapidly increasing pace of Russian airpower and to maintain the air superiority without which this nation will perish.

—Robert Blotz



## RADAR GUNSHIP HELPS TAC PILOTS BAG "FOE"

Korean tested Device Proves Deadly Accurate in Stopping Jet "Invaders"

### THE STORY BEHIND THE STORY

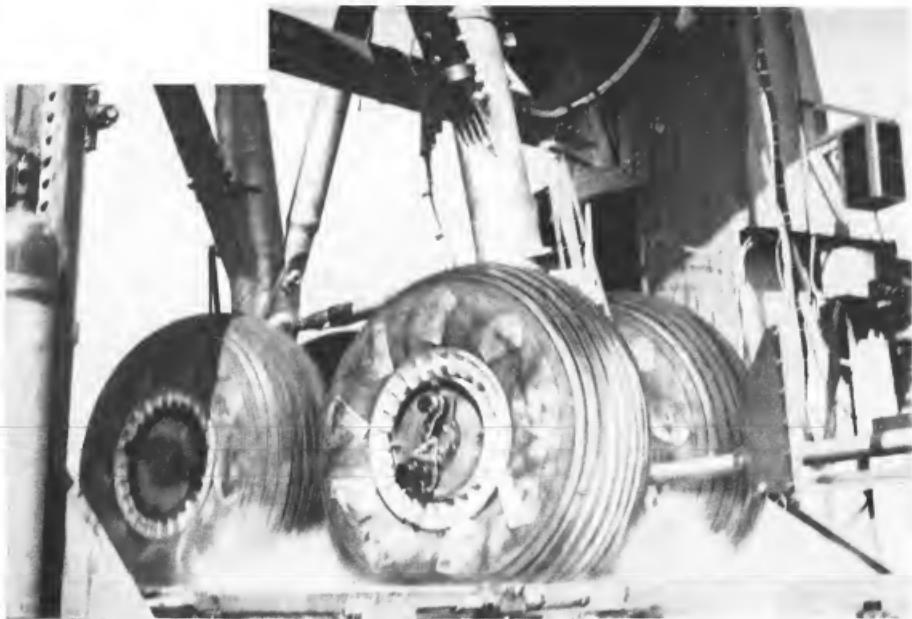
Here at home, where air defenses are constantly being strengthened, there's a good chance of detecting and intercepting hostile planes before they reach their destination. And abroad, as you've probably noticed from headlines like the one above, chances are good that aggressors would be intercepted and shot down by fighters from our overseas bases or from B-52 bombers.

One reason for the impressive marks made by interceptors is that air controllers are more accurate in their tracking of the approaching aircraft. But used in the planes. He watches an illuminated circle and dot reflected in his windshield. If the circle and dot are superimposed on the target jet, fire.

Developed through the joint efforts of the Instrumentation Laboratory of M.I.T., under Director Dr. C. Stark Draper, Sperry, and a U.S. Army Research Laboratory—the radar gun sight is an example of teamwork at its best—providing better weapons for defense efficiency and economy.

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these punishing tests is the new Lockheed Super G Constellation, already placed in service by TWA. The Super G Connie's landing gear is only one of the many structural sections of the new plane fastened with vibration-proof Elastic Stop nuts.

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